HUSSMANN®

Freedom Line

Low or Medium Temperature
Compressor Ready
Narrow Footprint
Reach-in
Merchandisers

Installation & Service Manual

Shipped With Case Data Sheets

IMPORTANT

Keep in store for future reference!

P/N 0520677_C

November 2012

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WARRANTY

IMPORTANT
KEEP IN STORE FOR FUTURE REFERENCE
Quality that sets industry standards!

HUSSMANN®
12999 St. Charles Rock Road • Bridgeton, MO 63044-2483
U.S. & Canada 1-800-922-1919 • Mexico 1-800-890-2900
www.hussmann.com

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REVISION HISTORY

REVISION C – November 2012
Section 2: Added Safe-NET startup code and optional audible alarm

REVISION B – August 2012
Section 1: Added disassembly / reassembly procedure for fitting cases through smaller doors and passage ways.
Section 7: Added Emerson Electonic Unit Control Instructions

REVISION A – October 2011
Original Issue

* *

ANSI Z535.5 DEFINITIONS

• **DANGER** – Indicate[s] a hazardous situation which, if not avoided, will result in death or serious injury.

• **WARNING** – Indicate[s] a hazardous situation which, if not avoided, could result in death or serious injury.

• **CAUTION** – Indicate[s] a hazardous situation which, if not avoided, could result in minor or moderate injury.

• **NOTICE** – Not related to personal injury – Indicates[s] situations, which if not avoided, could result in damage to equipment.

INSTALLATION

NSF CERTIFICATION

These merchandisers are manufactured to meet ANSI / National Sanitation Foundation (NSF®) Standard #7 requirements. Proper installation is required to maintain certification. Near the serial plate, each case carries a label identifying the type of application for which the case was certified.

ANSI/NSF-7 Type I – Display Refrigerator / Freezer
Intended for 75°F / 55%RH Ambient Application

ANSI/NSF-7 Type II – Display Refrigerator / Freezer
Intended for 80°F / 55%RH Ambient Application

ANSI/NSF-7 – Display Refrigerator
Intended for Bulk Produce

FREEDOM LINE DESCRIPTION

The Freedom Line RLN and RMN cases are designed to be ready for remote installation of a top-mounted air-cooled condensing unit, such as Hussmann's TCLA through TCMD series of condensing units. They are controlled by the Safe-NET III electronic control. The case temperature is controlled by cycling the compressor based on the discharge air temperature input. The sensor for this input is located above the interior top panel at the right door. Another sensor, located on the bottom center evaporator coil return bend, is used for defrost termination. The Safe-NET III control is pre-programmed for both ice cream and frozen food operation, and is adjusted for the required temperature by the control knob located on the front of the controller, which is on the top of the case.

RLN cases running on individual condensing units may be installed as stand-alone cases with ends, or as a part of a lineup.

When installed in a lineup, Hussmann recommends that partitions be installed between individual cases to prevent frost buildup and other issues that might result from different defrost schedules and operating temperatures.

LOCATION

These merchandisers are designed for displaying products in air conditioned stores where temperature is maintained at or below the ANSI/NSF-7 specified level and relative humidity is maintained at or below 55%. Placing refrigerated merchandisers in direct sunlight, near hot tables or near other heat sources could impair their efficiency. Like other merchandisers, these are sensitive to air disturbances. Air currents passing around merchandisers will seriously impair their operation. Do NOT allow air conditioning, electric fans, open doors or windows, etc. to create air currents around the merchandisers.

To prevent sweating on the exterior surfaces of merchandisers, there must be A MINIMUM CLEARANCE OF 4 INCHES (102 MM) between the merchandisers and other fixtures or walls.

Product should always be maintained at proper temperature. This means that from the time the product is received, through storage, preparation and display, the temperature of the product must be controlled to maximize the life of the product.

Condensing units installed on top of the merchandiser require air circulation to operate properly. Blocking or restricting air flow will adversely affect performance and may damage the refrigeration system.

If the ceiling and/or walls are built up around the merchandiser, allow for a sufficient gap above or behind the merchandiser to provide adequate air circulation. When merchandisers are installed in a lineup, case must be taken to ensure that warm condenser air is not blown from one unit into the condenser of the adjacent unit.

SHIPPING DAMAGE

All equipment should be thoroughly examined for shipping damage before and during unloading. This equipment has been carefully inspected at our factory. Any claim for loss or damage must be made to the carrier. The carrier will provide any necessary inspection reports and/or claim forms.

Apparent Loss Or Damage
If there is an obvious loss or damage, it must be noted on the freight bill or express receipt and signed by the carrier's agent; otherwise, carrier may refuse claim. The carrier will supply necessary forms.

Concealed Loss Or Damage
When loss or damage is not apparent until after equipment is uncrated, a claim for concealed damage is made. Upon discovering damage, make request in writing to carrier for inspection within 15 days and retain all packing. The carrier will supply inspection report and required claim forms.

EXTERIOR LOADING

Do NOT walk on top of merchandisers or damage to the merchandisers and serious personal injury could occur. **THEY ARE NOT STRUCTURALLY DESIGNED TO SUPPORT EXCESSIVE EXTERNAL LOADING** such as the weight of a person. Do not place heavy objects on the merchandiser.

MERCHANDISERS SHIPPED WITH END INSTALLED

If the case was shipped with the end installed, two long bolts were used to hold the shipping brace to the end. If the shipping bolts are reinserted after removing the brace, they will extend into the product area and may damage the coil. **THEREFORE, BE SURE TO REPLACE THESE BOLTS WITH THE SHORTER BOLTS PROVIDED.**

Be careful not to damage the factory-installed end while moving the merchandiser. Make sure that tools are positioned past the end and beneath the merchandiser's support bar.

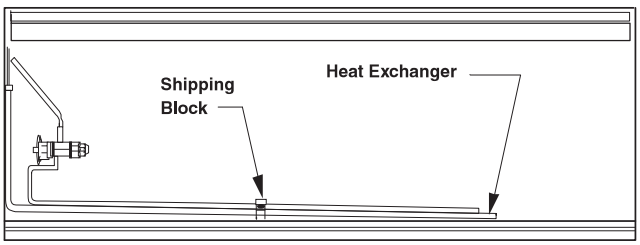
⚠ CAUTION

Do not walk or put heavy objects on case.

SHIPPING BRACES

Move the merchandiser as close as possible to its permanent location and then remove all packaging. Check for damage before discarding packaging. Remove all separately packed accessories such as kits and shelves.

Locate the shipping block in the center of the heat exchanger (see illustration), and remove it before piping the merchandiser. This block was installed to minimize shipping vibration.



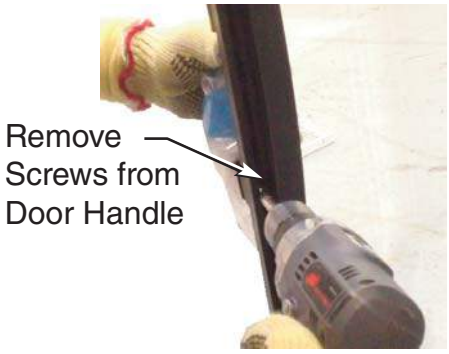
Top View of Merchandiser

MOVING MERCHANDISER THROUGH NARROW STORE ENTRANCES

Some exterior merchandiser parts may be disassembled for transit access through small doors or passage ways. The minimum door opening is 36 in. x 83 in. This procedure takes approximately 30 minutes to disassemble and reassemble one case. Contact your Hussmann representative to see if store merchandisers have this kit option.

Follow the steps below to decrease the Freedom profile for narrow access:

1. Remove the door handles.



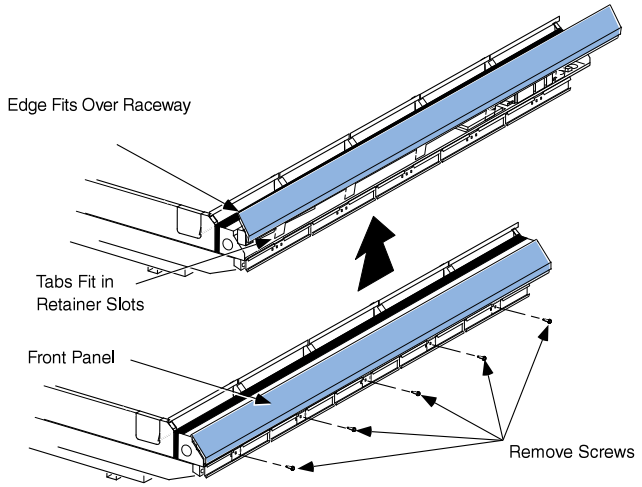
Follow the link below to watch a video clip of these parts being removed.

http://www.youtube.com/watch?v=QWRahAMg4JI

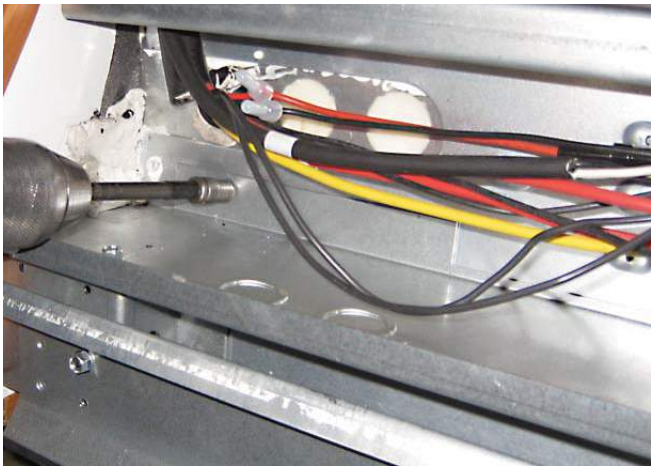
2. Remove the front bumper. Pull from the bottom and set aside.

3. Remove Lower Front Panel

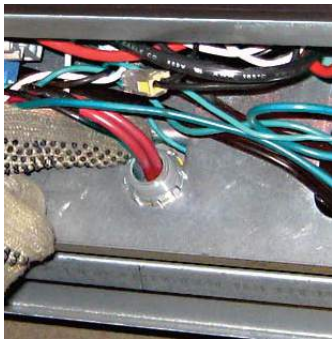
Remove the front panel as follows: remove screws from front panel tabs, then lift the front panel. Refer to the illustration below.



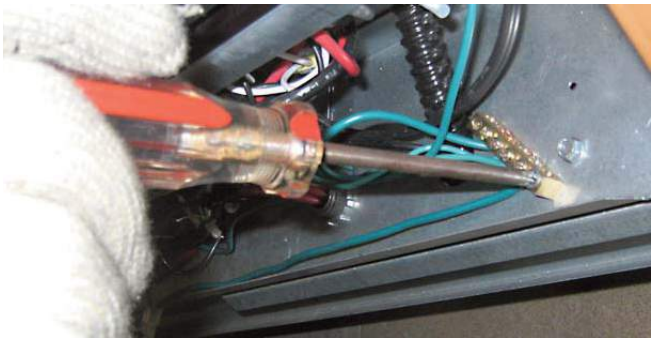
4. Remove the screws that attach the wireway pan to the bottom assembly.



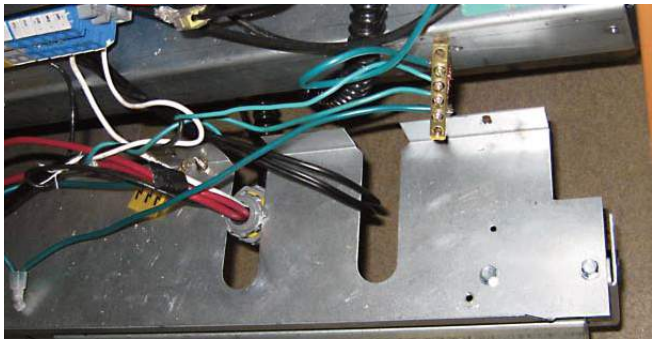
5. Detach the rubber and plastic gromets from the wireway pan.



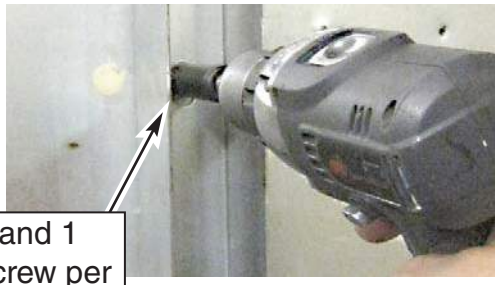
6. Remove the screws that attach the grounding lug to the wireway pan.



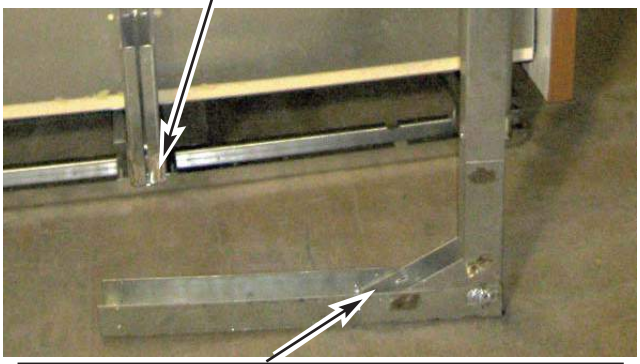
7. Slide the wireway pan out, and remove it from the case. Bumper brackets and supports are attached to wireway pan. Removing the pan will remove the entire assembly.



8. Remove the back, external braces from the rear of the case as shown below. Braces will slide straight back away from the case when nuts and screws are removed.



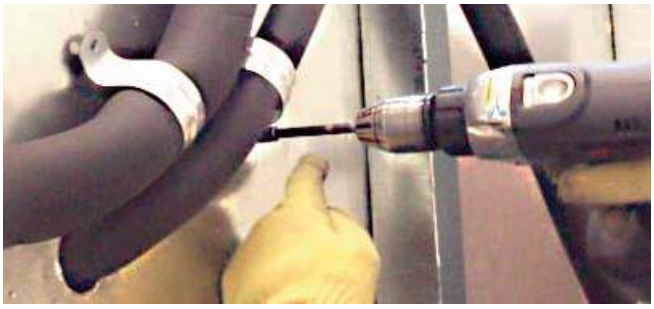
6 nuts and 1 bottom screw per external brace



Bottom screw is located approximately 10 inches inboard from the rear of the case. Bottom screw location on removed rear brace.

9. Remove the braces and flexible insulation from the hoses at the rear of the case.

NOTE: Care must be taken to ensure that insulation is not damaged during removal or replacement.



10. Remove the sealing gum from around the refrigeration tubing.

11. Pull the hoses to the inside of the case. Avoid bending tubing sharply to prevent damaging the tubes.

    A. Check that all wiring is secured inside of the case and wireway.

    B. Check that all hoses are tucked away.

    C. Use tie-wraps to secure any loose wires or hoses.

The electrical box, GFCI receptacle and evaporation pan are mounted on top of the case. They can be temporarily detached and suspended if required to provide clearance for door openings during shipment and installation.

Do not suspend these components by their wire conduits. The case height without these components installed on top is 82.75 in. (2102 mm). Case depth is 35.5 in. with handles, raceway pan and external frames removed.

Be sure to replace all screws and to secure all components. The condensing unit produces vibration that can cause screws to loosen.

Check the following before the rear of the case is positioned at its final location according to the store plan:

1. Make sure all electrical and refrigeration is installed and secured on the back and top of the case.

2. Ensure refrigeration tubing is attached sealed and insulated at the rear of the case as shown.

Secure Flex Hoses When Detached

3. **The external braces must be reinstalled with (6) nuts per brace, torqued to 24 foot pounds.**

4. Replace and secure condensate tubing.

FINAL LOCATION

Once the case reaches its final location, reassemble the wireway and door handles as follows:

1. Reinstall wireway pan in reverse order of removal.

2. **The ground lug must be reinstalled using the two screws provided.**

3. **Replace the conduit connectors and plastic gromets to the wireway pan.**

4. Replace wireway cover, bumper and door handles.

5. Use Sealing gum around refrigeration to seal each side of the merchandiser.

Use sealing gum around refrigeration lines both inside and outside of the merchandiser.

LEVELING

Merchandisers must be installed level to ensure proper operation of the refrigeration system and to ensure proper drainage of defrost water. When leveling merchandisers, use a carpenter's level as shown.

Metal leveling shims or wedges are provided with each merchandiser for use if needed.

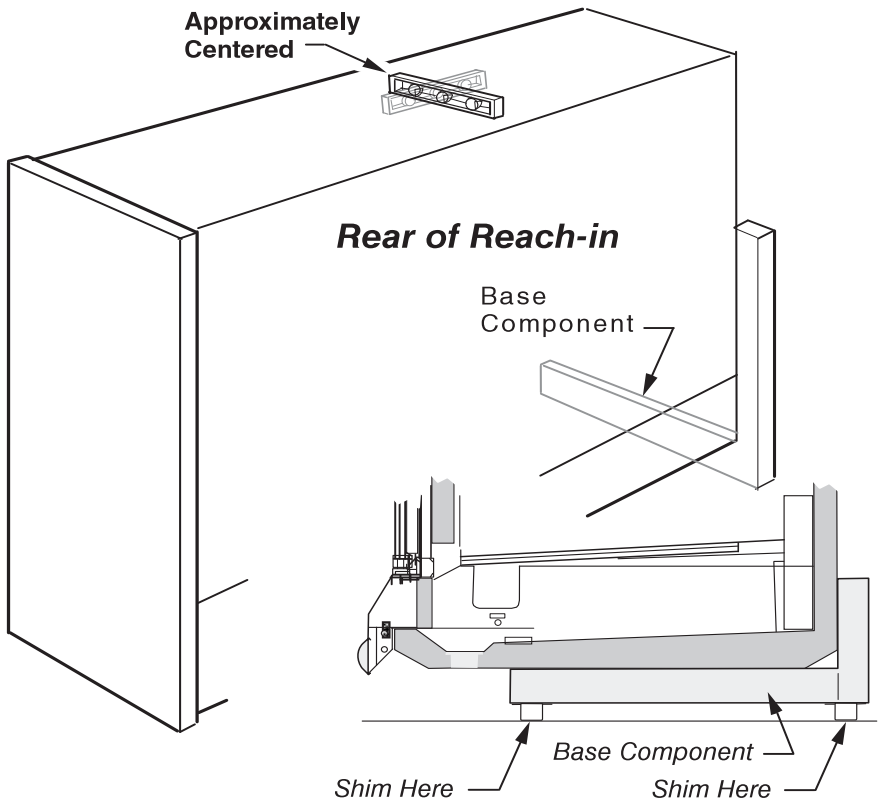
NOTE: BEGIN LINEUP LEVELING FROM THE HIGHEST POINT OF THE STORE FLOOR.

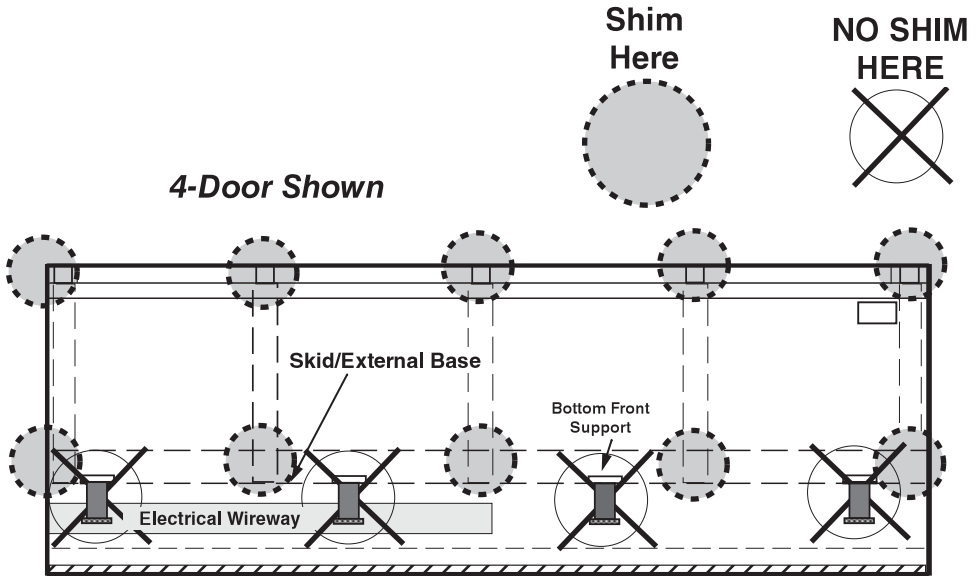
Place shims under the rail and make sure that they are positioned at a base component (cross-bar). This transfers the weight directly from the loaded case through to the floor.

Placing shims at other locations will cause uneven distribution of weight leading to piping leaks, as well as sagging or wracked doors.

DOOR ADJUSTMENT

After leveling and joining the merchandisers, adjust and level doors according to manufacturer's instructions shipped with each product. Factory settings may be lost due to vibration during shipment.





Correct Shim Location is Critical

JOINING

Sectional construction means that two or more merchandisers may be joined in line yielding one long continuous display requiring only one pair of ends. **Joining kits and instructions are shipped with each merchandiser.**

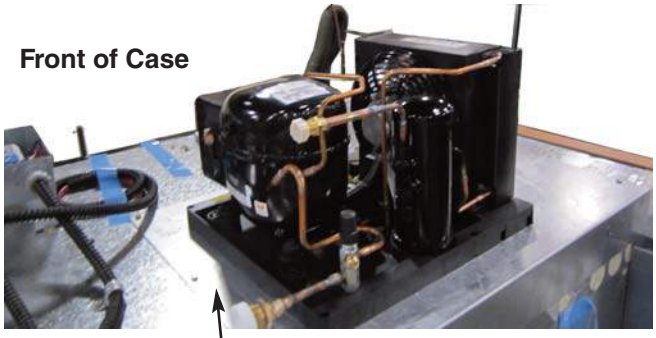
To join like fixtures, a joining kit is required. To join unlike fixtures, or like fixtures operating at different temperatures, a 1½ inch (38 mm) partition kit is required. To join same temperature merchandisers on different defrost cycles, a plexiglass partition kit is required.

ALL JOINTS MUST BE AIR-TIGHT TO PREVENT FORMATION OF ICE OR CONDENSATION.

REFRIGERATION / ELECTRICAL / SAFE-NET III

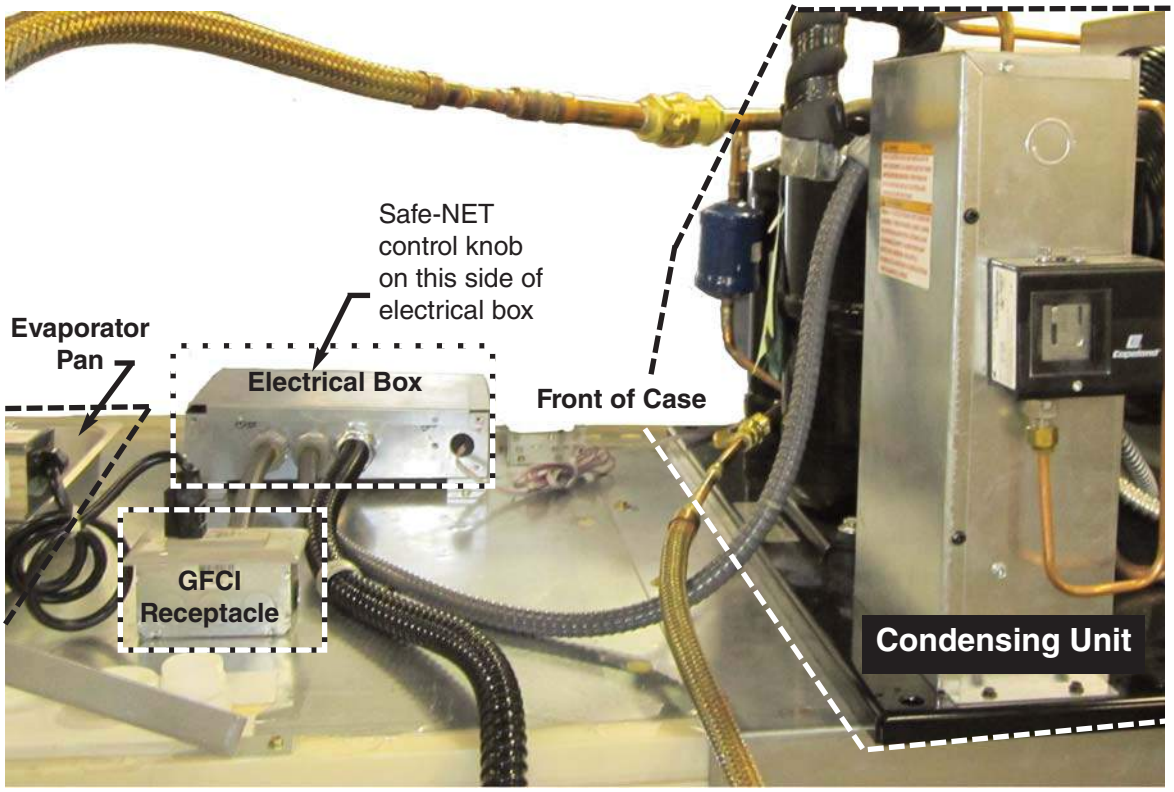
FIELD INSTALLATION OF CONDENSING UNIT

A mounting plate is provided on top of the case with pilot holes that provide specific attachment points for the condensing unit base. The mounting plate is located above the next to last door on the right.



After mounting the condensing unit, the electrical box and GFCI receptacle must be re-attached to the top. The condensate pan, if provided, is packed inside the case and must also be installed on top of the case and plugged into the 120V GFCI outlet provided. The TCMA, TCMB, and TCLA units have integral condensate pans, so an external pan is not required.

Exact component location is not critical; however, the components should be mounted in the general locations shown to ensure that electrical connections reach, and the condensate pan has adequate air flow from the condenser, and the Safe-NET adjustment knob is accessible.



Recommended Component Locations

ABOUT QUICK CONNECT COUPLINGS

Quick Connect fittings are provided on both the case inlet and outlet lines, and on Hussmann's TCL and TCM series of condensing units. The case and condensing unit are pre-charged with the correct amount of R404A refrigerant, and the lines are sealed. Connecting the Quick Connects together breaks the seals to connect the refrigeration lines of the unit to the case. The Quick Connects must be properly torqued to avoid refrigerant leaks.

CONNECT LINES

Mount the suction line and liquid line to the condensing unit. When ready to connect, remove protector caps and plugs from the Quick Connect couplings.

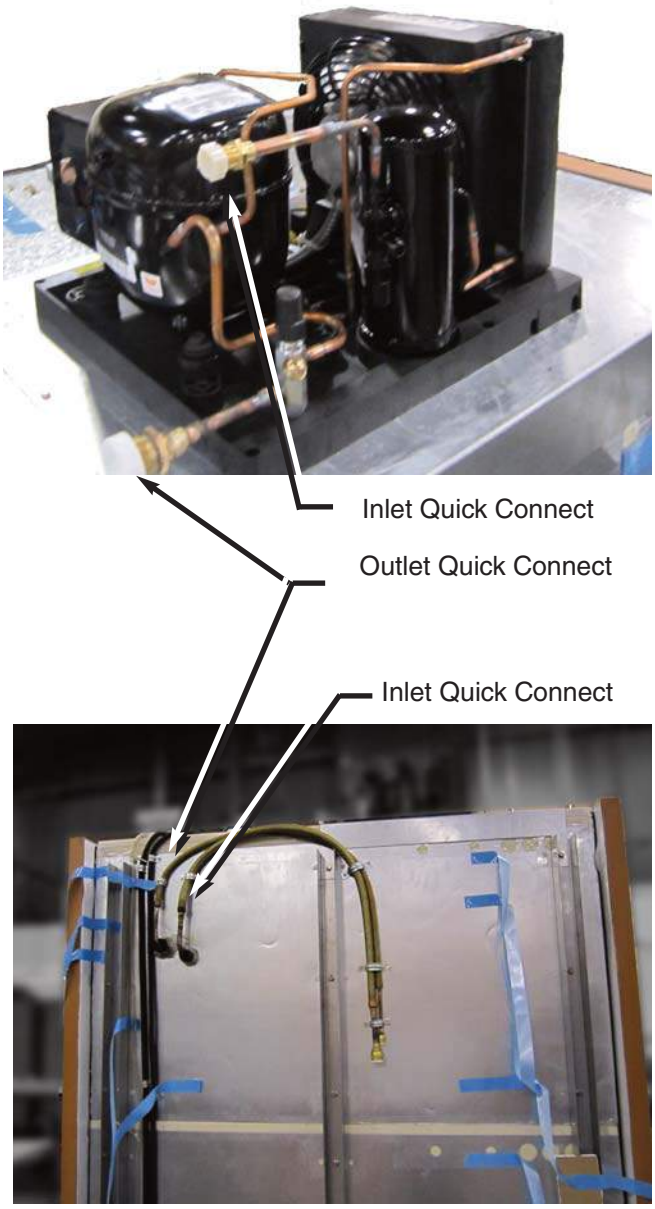
If necessary, carefully wipe coupling seats and threaded surfaces with a clean cloth to prevent the inclusion of dirt or any foreign material in the system.

Lubricate male half of diaphragm and synthetic rubber seal with refrigerant oil. Thread the coupling halves together by hand to ensure proper mating of threads. Use proper size wrenches (on coupling body hex and on union nut) and tighten until coupling bodies "bottom" or a definite resistance is felt.

Coupling	Hex Wrench Size
3/8 in. Male	3/4 in.
3/8 in. Female	13/16 in.
5/8 in. Male	1 1/16 in.
5/8 in. Female	1 5/16 in.

Use a torque wrench to tighten the quick connect couplings to these settings to get a leakproof seal.

Coupling Size	Foot Pounds (Ft. Lbs.)
3/8 in.	10-12
5/8 in.	35-45



INSULATE REFRIGERANT LINES

Suction lines are insulated to prevent condensation; extra insulation is provided to cover the field connected tubing sections. These exposed sections must be covered with insulation. Check that all suction lines are adequately covered with insulation, as some insulation may have been dislodged during shipping and installation. Avoid locating the tubing above the electrical box to prevent condensation from dripping onto electrical components.

FIELD WIRING

All wiring must be in compliance with NEC and local codes. Field wiring must be sized for component amperes stamped on the serial plate. Actual ampere draw may be less than specified.

Terminal blocks are used for field connection of the 120V single phase and 208/230V single phase power supply. The terminal blocks are located inside the electrical box on top of the case. The wiring diagram and circuit requirements are provided on the Technical Data Sheets provided with the case and condensing unit. The switch for 120V components is on top of the case, on the front of the electrical box. **The switch does not affect 208/230V circuits.**

⚠ CAUTION

Blocked drain lines will cause water to back up in the case and spill onto the floor, causing a slip hazard.

The wiring connection for the condensing unit is provided with 5-ft leads and 1/4-inch terminals. The conduit must be connected to the condensing unit electrical box, and the leads are connected to the condensing unit input terminals. The heated condensate pan, if provided, is plugged into the 120V GFCI receptacle at the top of the case.

Safe-NET III DISPLAY

Insert the Safe-NET III display from the front into the opening provided in the facade.

CONDENSATE WATER AND PUMP

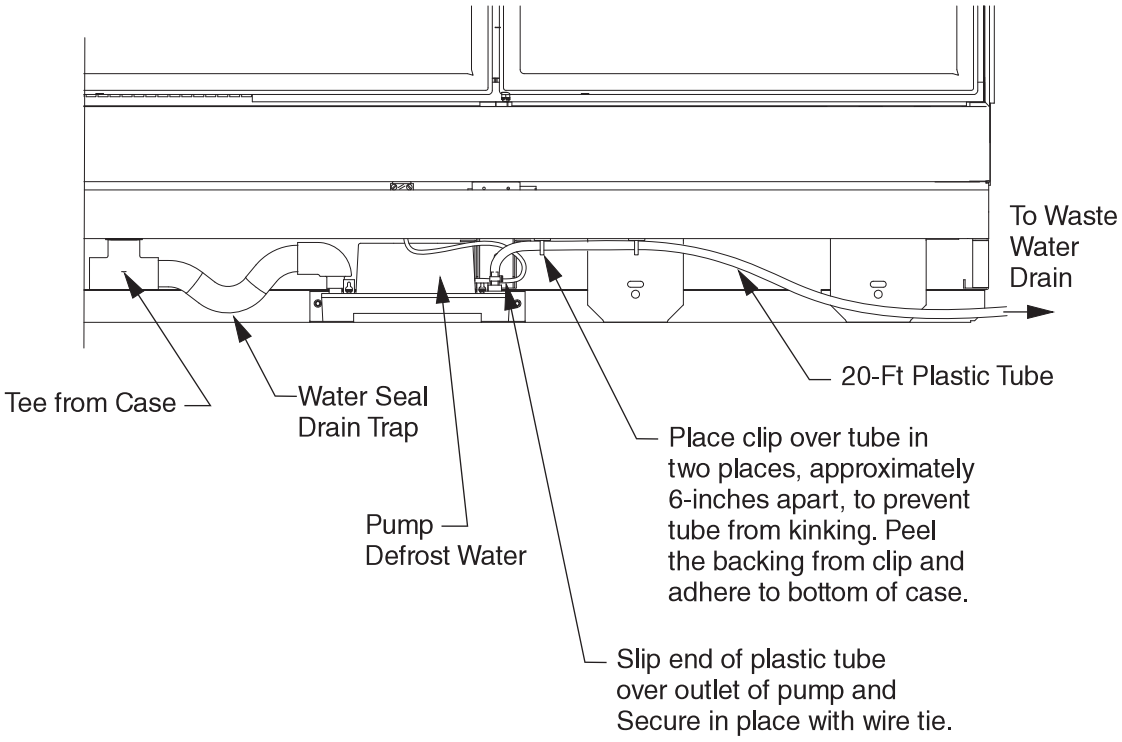
The bottom drain for defrost water from the evaporator coil of the RLN case is connected to an evacuation pump which uses 3/8-inch plastic drain tubing to pump the water to the condensate pan on top of the case. The tubing should be inspected through its entire length to ensure that it has not been cut, kinked, obstructed, or damaged during shipping and installation.

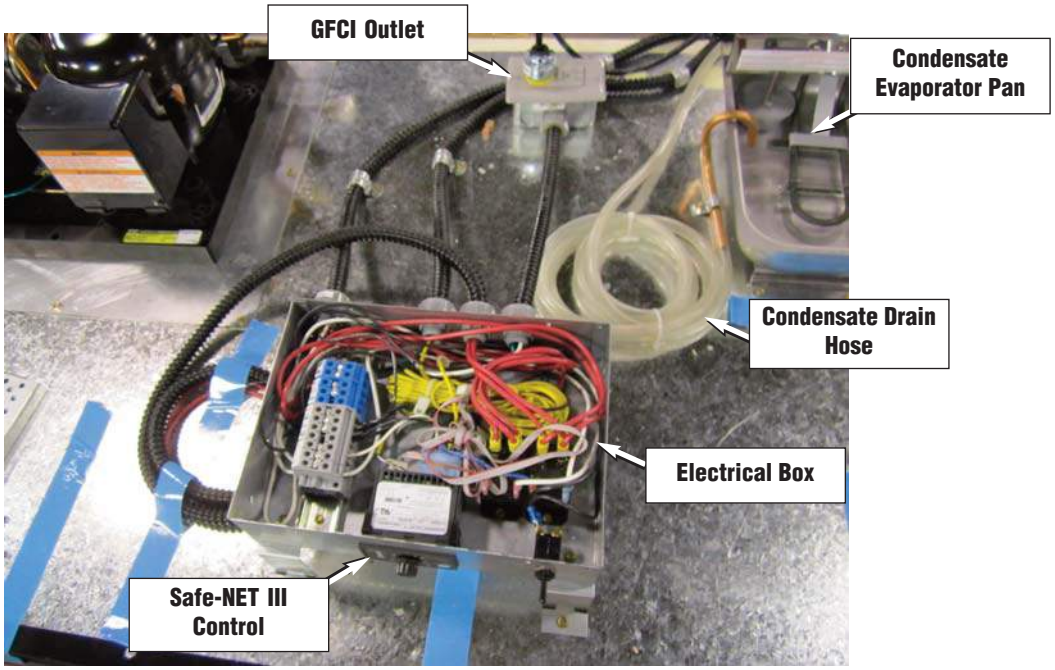
The illustration on the next page shows the location of the condensate pump and drain.

⚠ WARNING

— LOCK OUT / TAG OUT —
To avoid serious injury or death from electrical shock, always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to, such items as doors, lights, fans, heaters, and thermostats.

Installation of Defrost Water Drain Line to Case Condensate Pump
(Viewed from Front of Case with Shipping Brace Removed)


To Waste Water Drain
20-Ft Plastic Tube
Tee from Case
Water Seal Drain Trap
Pump Defrost Water
Place clip over tube in two places, approximately 6-inches apart, to prevent tube from kinking. Peel the backing from clip and adhere to bottom of case.
Slip end of plastic tube over outlet of pump and Secure in place with wire tie.



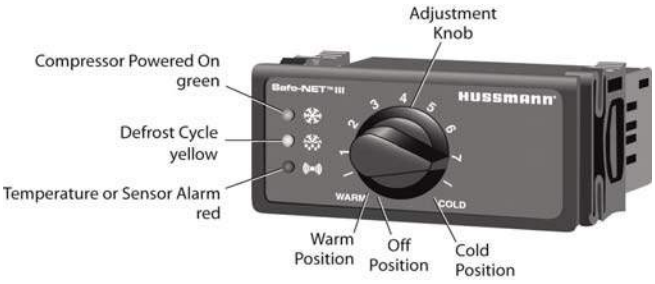
Safe-NET III™ TEMPERATURE AND DEFROST CONTROLLER

SAFE-NET III™ USER INSTRUCTIONS

Your refrigerated case uses a Hussmann Safe-NET™ III temperature and defrost controller to precisely maintain the temperature and prevent frost buildup on the cooling coil. LEDs indicate when the compressor or refrigeration is on, when the case is in a defrost cycle, if the temperature is outside the desired range, or if there is a sensor failure.

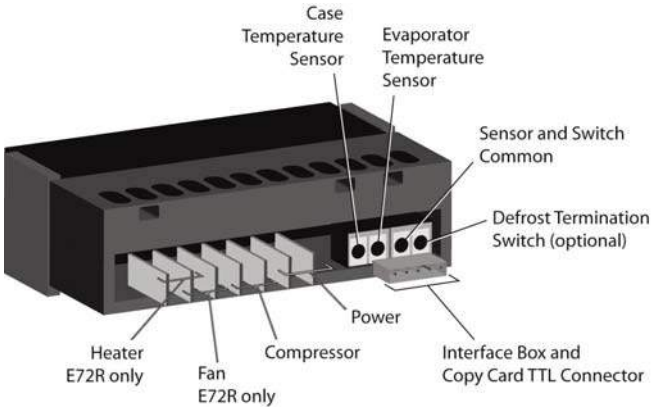
An adjustment knob allows the temperature to be set within the configured range and can power off the controller and compressor. Your controller has been custom-configured to provide the best temperature and defrost control for your chilled or frozen food.

The front of the controller has an adjustment knob and status LEDs. The back of the controller has connections for sensors and switched equipment.



The Safe-NET III controller includes the following features and connections.

• Adjustment knob:
Adjusts the temperature setpoint.
Turn adjustment knob to OFF to turn off refrigeration system. Unplug merchandiser from power before servicing the unit.



• Controller LEDs:
- Compressor Powered On LED (green): Lights while the compressor is running or the refrigeration valve is open.
- Defrost Cycle LED (yellow): Lights while the refrigeration coil is defrosting.
- Temperature or Sensor Alarm (red): Lights if the temperature is too warm or too cold. Flashes if a sensor fails.

• Audible Temperature Alarm (optional)
See page 2-8 for alarm settings.

• Rear connections:
– Case temperature sensor:
  • Typically senses the temperature of the air in the case.
  Used by the controller to determine when to power on or power off the compressor or refrigeration.
– Evaporator temperature sensor:
  • Senses the temperature of the refrigeration coil.
  Terminates a defrost cycle when refrigeration coil ice melts.
– Compressor or refrigeration relay:
  • Switches on the compressor or refrigeration valve for cooling.

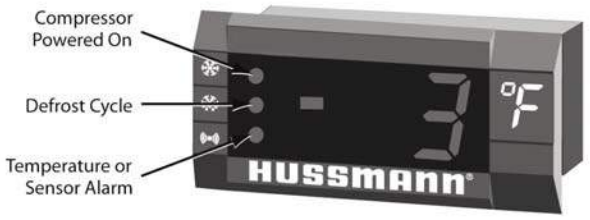
⚠ WARNING

The optional evaporator fan remains ON when the adjustment knob is in the OFF position.

DISPLAY

The display includes three red LEDs and two digits for temperature, defrost status, and error codes.

The three display LEDs are red; their behavior matches the LEDs on the controller.



START-UP

⚠ WARNING

The OFF Position does not disconnect line voltage to the input terminal blocks.

1. After the toggle switch is turned on, fans and lights will energize immediately.

2. After turning on the disconnect switch, wait for the self check to complete. During the self check, each LED flashes for one second, then all LEDs turn on for two seconds. If the LEDs do not flash, make sure the adjustment knob is not in the Off position.
   • After the self check, all LEDs turn off until the compressor starts. **There may be a delay before the compressor starts.** If the red Temperature or Sensor Alarm LED stays on after the self check.
   • The green Compressor Powered On LED turns on when the compressor starts.

3. The compressor will continue to run until it reaches its cut-out temperature (pulldown). Door and frame anti-sweat heaters will energize after the evaporator temperature reaches a stable operating temperature, this may take 30 minutes or longer.

⚠ WARNING

Product will be degraded and may spoil if allowed to sit in a non-refrigerated area.

NOTE: Do NOT load product until AFTER merchandiser operates for 24 hours and reaches desired operating temperature.

1. The merchandiser temperature displays at startup. The initial defrost starts twelve hours later. During defrost, the display shows "df." This reading will remain displayed during defrost and until it times out, even though the refrigeration mode has been initiated. (The green LED will be lit.)

2. The compressor will start after a 30 second delay once power is applied.

3. The compressor will continue to run until it reaches its cut-out temperature (Pulldown).

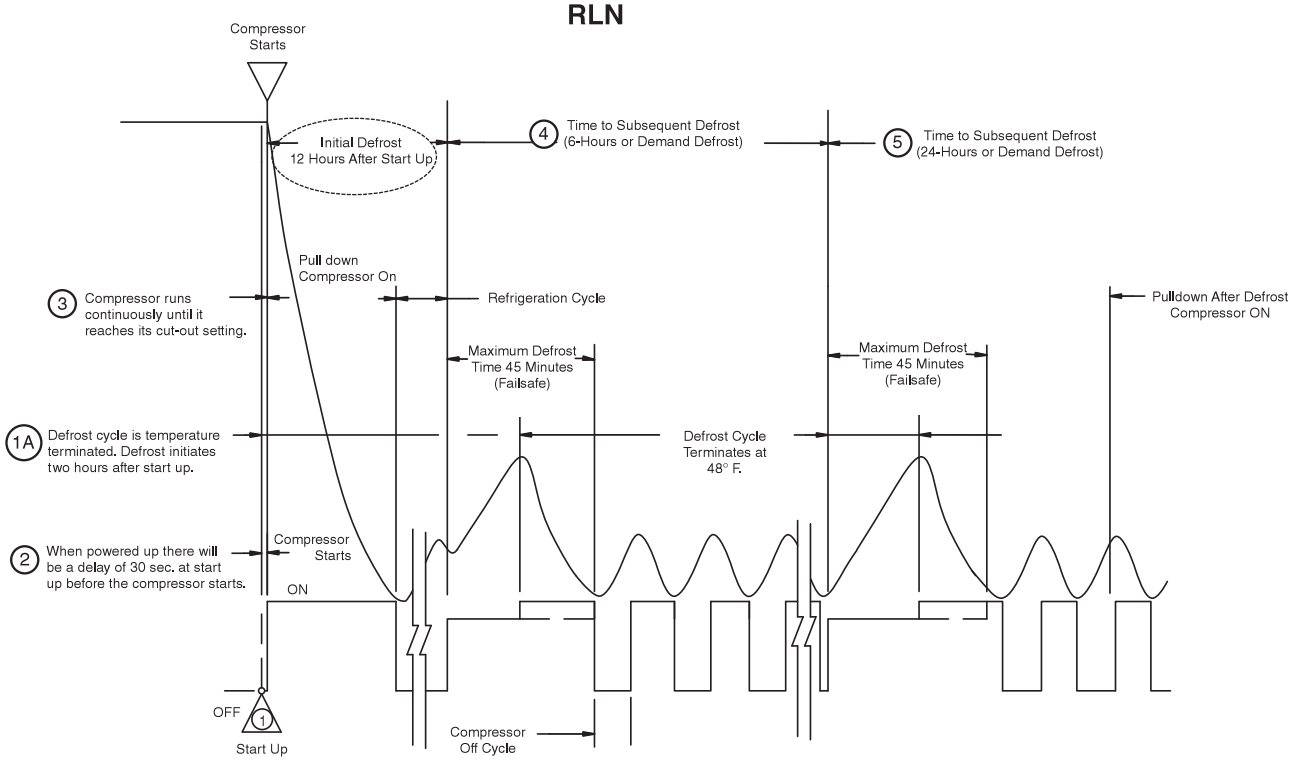
4. The refrigeration cycle will continue for the next subsequent scheduled (24-hours) or demand defrost.

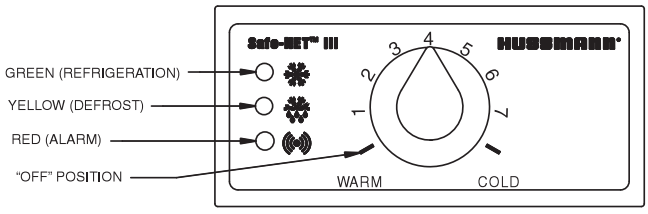
5. The above process will repeat (steps 3 and 4) until the power is interrupted.

6. If power stops, the process will start over at step 1, and the time to subsequent defrost will reset.

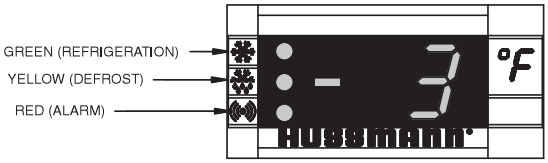
7. Medium temperature is the same except for a 60-minute time terminated defrost

Sequence of Operation
RLN


Compressor Starts
Initial Defrost 12 Hours After Start Up
4 Time to Subsequent Defrost (6-Hours or Demand Defrost)
5 Time to Subsequent Defrost (24-Hours or Demand Defrost)
Pull down Compressor On
3 Compressor runs continuously until it reaches its cut-out setting.
Refrigeration Cycle
Pulldown After Defrost Compressor ON
Maximum Defrost Time 45 Minutes (Failsafe)
Maximum Defrost Time 45 Minutes (Failsafe)
1A Defrost cycle is temperature terminated. Defrost initiates two hours after start up.
Defrost Cycle Terminates at 48° F.
2 When powered up there will be a delay of 30 sec. at start up before the compressor starts.
Compressor Starts
ON
OFF
1
Start Up
Compressor Off Cycle



Safe-NET III Controller



DISPLAY

Low Temperature Freedom Safe-NET III Settings

Safe-NET Dial	Discharge air Cut-In	Discharge air Cut-Out	Avg Discharge Air Temperature	Product Temperature Range
0	Off			
1	0	-6	-2	-5 to 10
4	-8	-14	-6	-11 to 5
7	-17	-23	-14	-18 to 0

Medium Temperature Freedom Safe-NET III Settings

Safe-NET Dial	Discharge air Cut-In	Discharge air Cut-Out	Avg Discharge air Temperature	Product Temperature Range
0	Off			
1	38	32	36	32 to 42
4	35	29	33	29 to 39
7	33	27	31	27 to 37

TEMPERATURE ADJUSTMENT

Rotate the adjustment knob counter clockwise for a warmer setpoint or clockwise for a colder setpoint.

- While the temperature is being adjusted, the optional display shows the setpoint (cut out value). A few seconds after the temperature is set, the display reverts to showing the sensed temperature in the merchandiser.

Alarm Settings	
Low Temperature	–7°F to 10°F
Medium Temperature	43°F to 48°F

Alarm settings vary depending on temperature control setting. The Safe-NET control features an alarm delay to allow for stocking, pulldown after defrost, and startup.

ALARMS AND CODES

FLASHING TEMPERATURE OR SENSOR ALARM LED, E1 OR E2

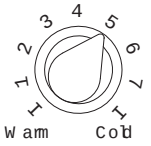
If the Temperature or Sensor Alarm LED (red) on the controller and display is flashing, a temperature sensor has failed. The display shows E1 if the case sensor has failed or E2 if the evaporator sensor has failed.

If the merchandiser sensor fails, refrigeration will run continuously. Turn off, or repeat a duty cycle of a few minutes on and a few minutes off.

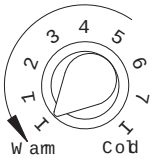
When the Safe-NET control is powered up, a two-digit code will be displayed indicating that the current settings are installed.

Safe-NET Status Code	
Low Temperature	68
Medium Temperature	69

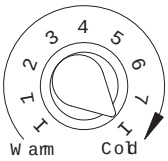
MANUAL DEFROST



1. Note location of knob setting



2. Rotate knob fully counterclockwise until it stops (full warm - "OFF" position)

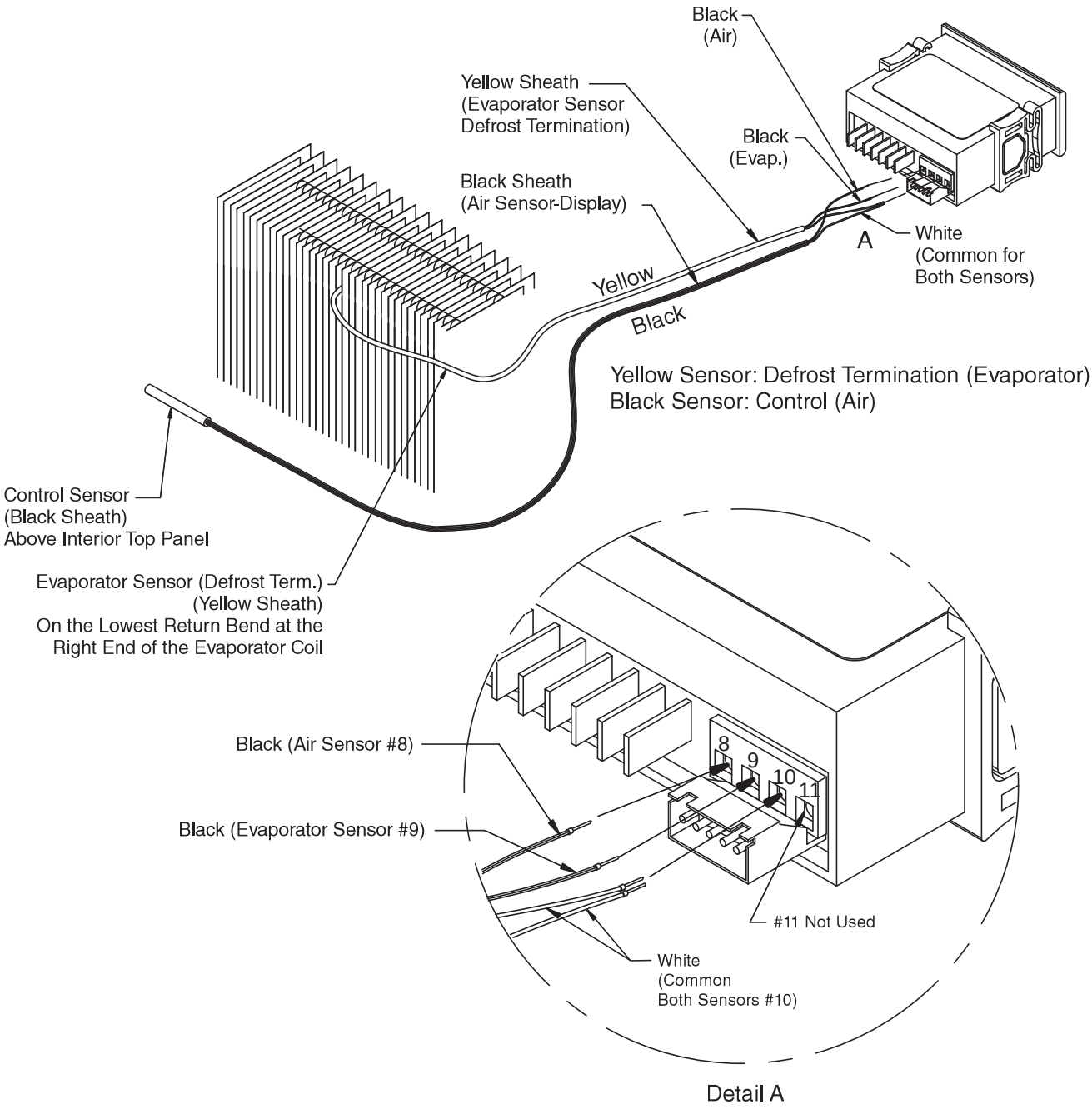


3. After 10 seconds, but before 20 seconds, rotate knob fully clockwise until it stops (full cold position)

Note:
This procedure initiates a manual or forced defrost.

IMPORTANT: Return the control knob to its original setting (Step 1) once the manual defrost has been initiated.

Typical Sensor to Control Configuration



CONTROLS and ADJUSTMENTS

Refrigeration Controls			Defrost Controls			
Model	Product Application	Discharge Air Temperature	Defrost Frequency (per day)	Type of Defrost	Termination Temperature	Failsafe Time (Minutes)
RLN	Frozen Food	–5° F	1	Electric	48° F	45
RLN	Ice Cream	–12° F	1	Electric	48° F	45
RMN	Medium Temp. (Dairy, Deli)	32° F	1	Off Time	NA	60

1. The Safe-NET III Controller controls refrigeration temperature. This is factory installed in the control panel. Adjust this control knob to maintain the discharge air temperature shown. Measure discharge air temperatures at the center of the honeycomb.

For low temperature models, defrosts are time initiated and temperature terminated. The defrost setting is factory set as shown.

To ensure a thorough defrost, the defrost must be terminated by the temperature termination setting — not by time.

For medium temperature models, defrost is time initiated and time terminated.

ALWAYS CHECK THE SERIAL PLATE FOR COMPONENT AMPERES.

Electric Defrost is standard for low temperature merchandisers and requires temperature termination. Off Time Defrost is standard for medium temperature merchandisers and is time terminated.

When two or more merchandisers with full length wireways are installed in line, remove the splashguards, end caps and wireway covers, and install the nipple and nuts (supplied) providing electrical passage from one merchandiser to the next. **Following NEC and local codes is the responsibility of the electrical contractor.**

MERCHANDISER ELECTRICAL DATA

Merchandiser data sheets for specific models are shipped with this manual. The data sheets provide merchandiser electrical data, standard electrical schematics, parts lists and performance data. ***Refer to the merchandiser data sheets and merchandiser serial plate for electrical information. Refer to the separate wiring diagrams shipped with the case for specific information about the merchandiser and any optional wiring kits that may have been applied.***

ELECTRICAL CONNECTIONS

All wiring must be in compliance with NEC and local codes.

⚠ WARNING

Terminal block NOT for case-to-case wire connection.

IDENTIFICATION OF WIRING

Leads for all electrical circuits are identified by colored plastic bands. These bands correspond to the color code sticker (shown below) located inside the merchandiser wireway.

It is the contractor's responsibility to install merchandiser(s) in accordance with all local building and health codes.

WIRING COLOR CODE

Leads for all electrical circuits are identified by a colored plastic band: neutral wire for each circuit has either White insulation or a White plastic sleeve in addition to the color band.

PINK .....REFRIG. THERMOSTAT LOW TEMP.	ORANGE OR TAN .....LIGHTS
LIGHT BLUE .REFRIG. THERMOSTAT NORM TEMP.	MAROON...RECEPTACLES
DARK BLUE..DEFROST TERM. THERMOSTAT	YELLOW*...DEFROST HEATERS, 120V
PURPLE .....ANTI-SWEAT HEATERS	RED* .....DEFROST HEATERS, 208V
BROWN .....FAN MOTORS	
GREEN* .....GROUND	

*EITHER COLORED SLEEVE OR COLORED INSULATION

ELECTRICIAN NOTE: Use copper conductor wire only.

CASE MUST BE GROUNDED

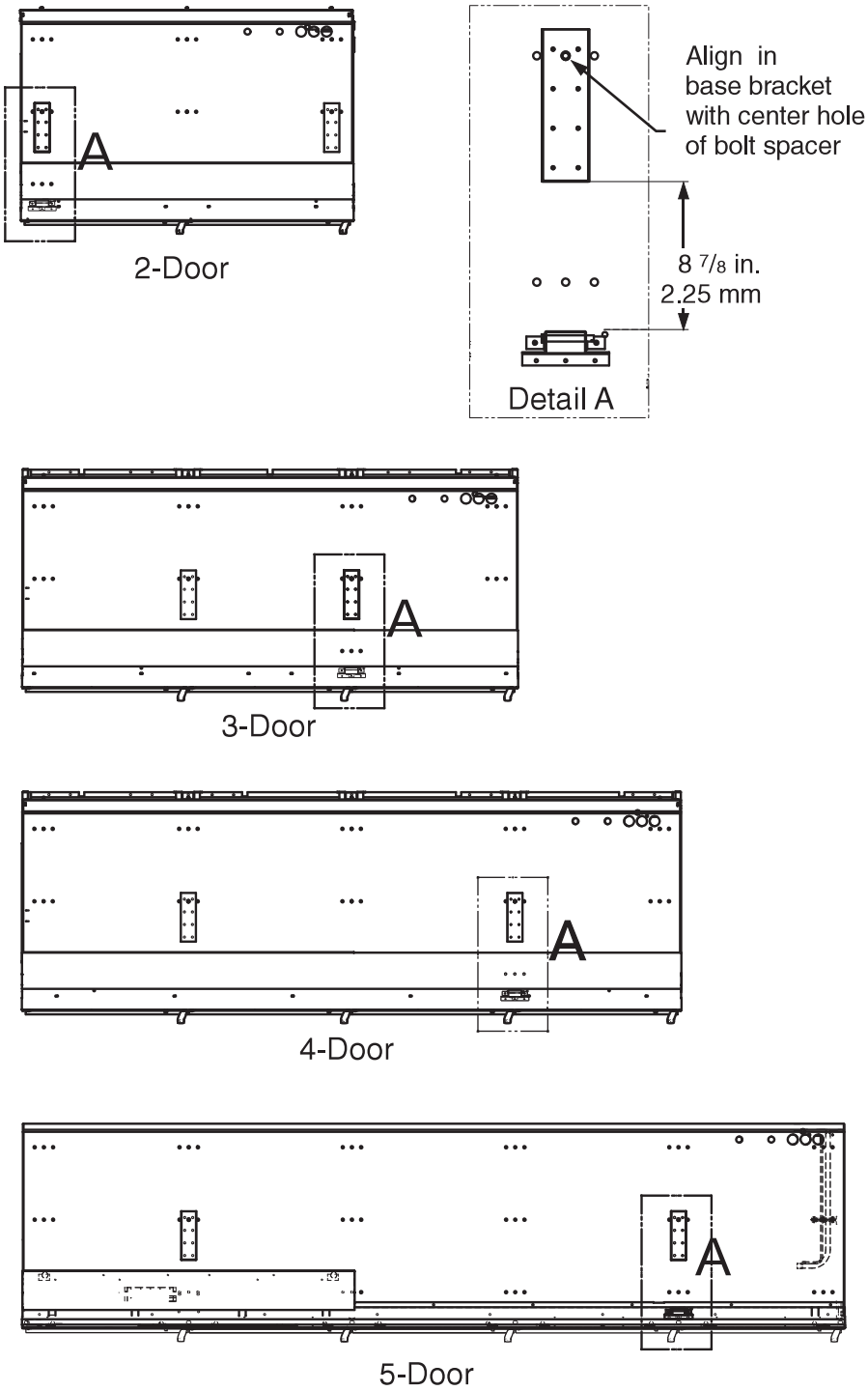
THESE ARE MARKER COLORS WIRES MAY VARY.

FACADE AND SPLASHGUARD

INSTALL FACADE

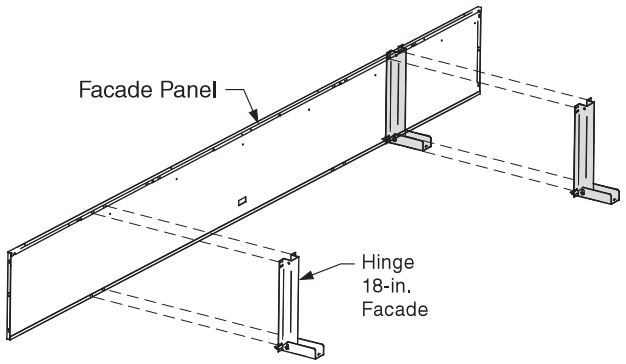
Refer to the Hinge Location illustration to determine where hinges will be positioned on the top of the merchandiser.

Notice that hinge position will vary with the number of doors, or length, of the merchandiser.



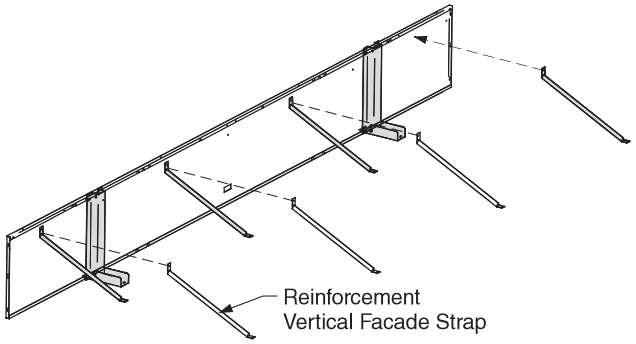
Facade Hinge Locations

Identify the corresponding positions on the facade panel, then fasten the hinges to the facade panel with provided screws.



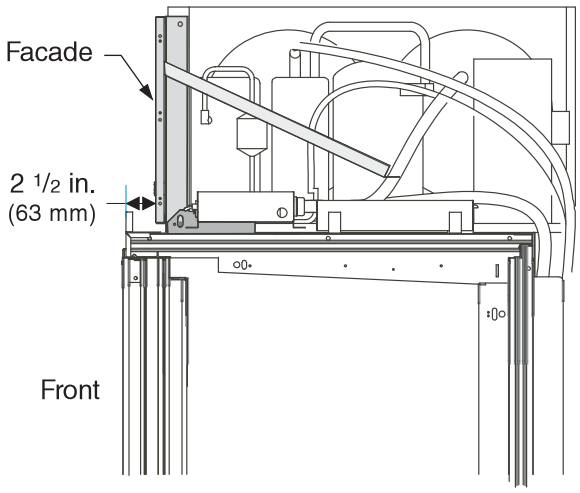
Fasten Hinges to Facade

Attach reinforcement straps to the Facade Panel with provided screws.



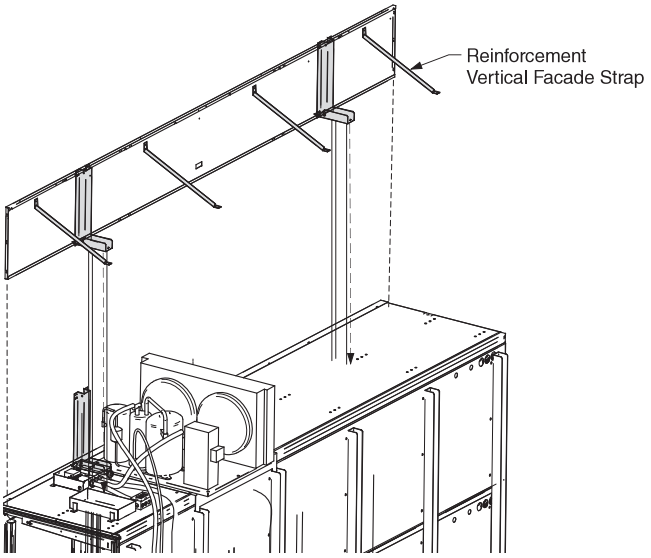
Fasten Reinforcement Straps to Facade

Position the facade centered on case length and recessed from the fascia as shown in the side view. One hinge will be between the condensing unit and the electrical box. If necessary, the electrical box can be relocated.



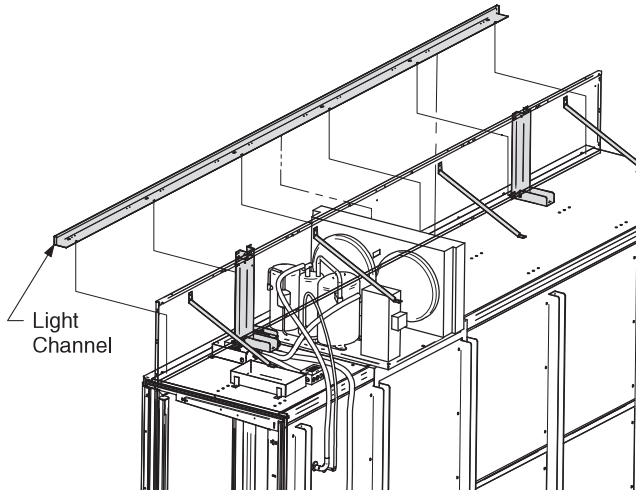
Position Facade

Fasten the hinge
Fasten the reinforcement straps after hinges are attached using provided screws.



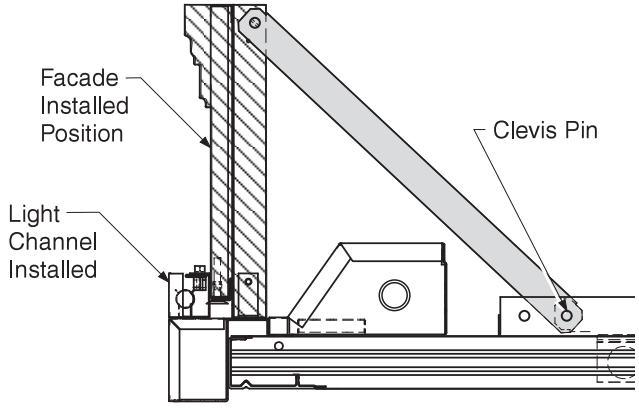
Fasten Facade to Merchandiser

Position the facade light channel as shown below. Fasten to merchandiser using provided screws.



Position Facade

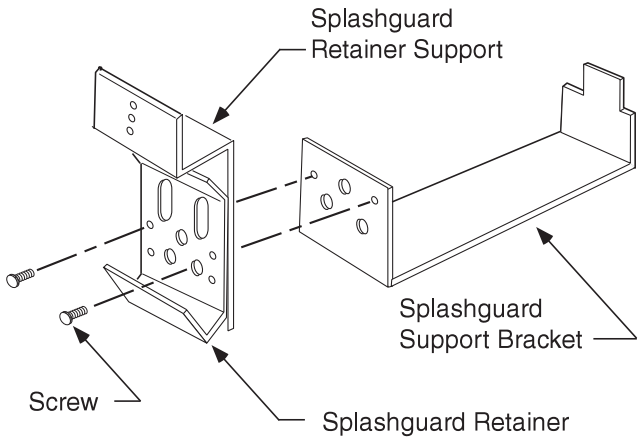
The end view below shows the correct placement of the light channel, facade, hinges and supports.



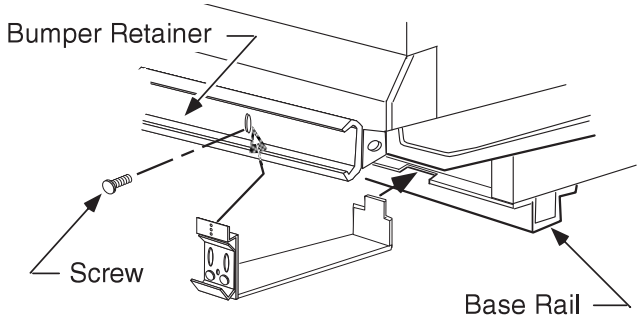
End View of Facade

INSTALLING SPLASHGUARD BRACKETS

1. Attach splashguard retainer and splashguard retainer support to splashguard support bracket using two screws per bracket.



2. ***INSTALL SPLASHGUARD SUPPORT BRACKETS BEFORE PIPING CASE.*** The leveling brackets have a maximum extension of one (1) inch (25 mm) for uneven floors.



DO NOT PLACE SHIMS UNDER SPLASHGUARD BRACKETS.

INSTALLING BUMPERS

Offsetting the bumpers and top rails helps to disguise the joint locations, giving the lineup a smoother look.

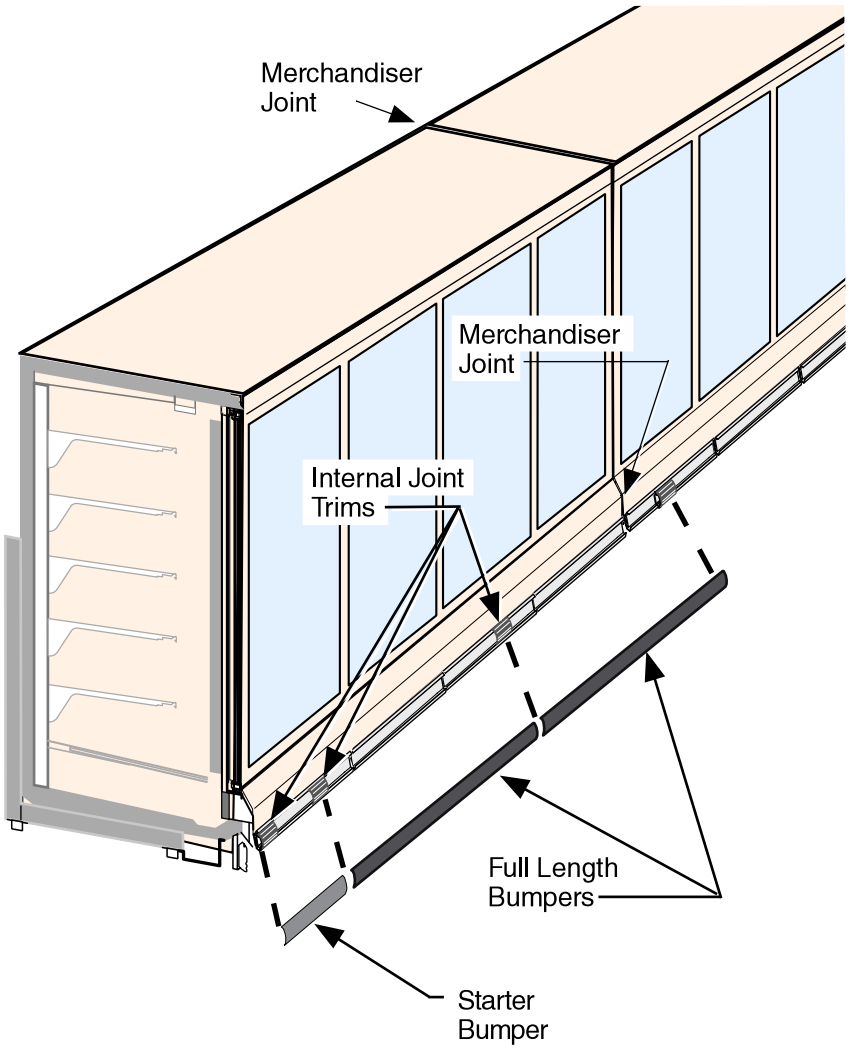
Begin at the left end of the line-up. A starter bumper is factory-installed with end kits. Insert the internal joint trim, then add the full-length bumper.

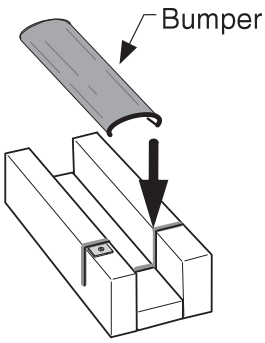
Align each bumper section with its retainer and push into place, working from the end of the lineup. Install full length bumpers and internal joint trims offset across joints. Make sure that no gaps exist between sections. Continue installing bumpers the length of the line up.

Do NOT install the last bumper sections at this time. These sections will be installed in the last step.

Once all except the last section of bumper have been installed, refrigerate the case line-up for at least six (6) hours. The last sections of bumper should be kept inside a refrigerated case or cooler during this time to allow the bumpers to contract.

Before installing the last full-length section, measure the remaining space. Use a miter box and fine-tooth saw to cut last bumper to length. Install the last section.

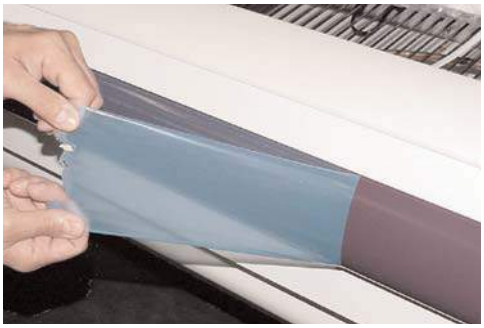




Miter Box

Remove protective film from bumpers once installation is complete.

Optional end bumpers are factory-installed.



START UP / OPERATION

⚠ WARNING

Start up should be performed only by a qualified technician.

PRIOR TO START UP CHECKLIST

- Is the case connected to a power supply as specified on the nameplate?
- Is the power on at the breaker panel?
- Are the doors properly torqued? Are they self closing? Check each door from a fully open position and from about a 1-inch open positions.
- Are the evaporator fans plugged in? Do they rotate freely? (The fans can be inspected by lifting the deck pans in the bottom of the cases. Manually rotate each fan to confirm it is free and visually inspect to confirm that each fan is plugged into its receptacle.)
- Verify that refrigeration line shutoff valves are in the back-seated (open) position.
- Check that the Safe-NET control knob is in the correct position:
  Low temperature:
  7 for ice cream and 1 for frozen food
  Medium temperature:
  7 for colder, 1 for warmer
  The unit will shut off when the knob is set to 0.

START UP CHECKLIST

- Once the case is considered ready for start up, move the main switch on the electrical box to the “on” position.

  This switch is located on the front of the electrical box, on the top of the case. This toggle switch turns on the power to the condensing unit, and all case electrical components, including anti-sweat heaters, lights and fans.
- Check the reading on the Safe-NET III display; it should be displaying the case temperature. The display is located in the center of the front of the facade above the doors. The displayed temperature will show the merchandiser’s discharge air temperature.
- Listen for any unusual sounds or events. For example: evaporator fan blade interference, compressor trip on overload, or high head due to excessive ambient temperature, circuit breaker trip, etc.
- Check the fan at each door to ensure all fans are running. The discharge air output at the top inside front of the case should be relatively even across the length of the case (honeycomb area).

DEFROST

Defrost will occur 12 hours after switching the disconnect switch to to the ON position. Defrost can be set to any time desired by switching the unit off, then back on again, 12 hours before the desired defrost time. “Df” is displayed on the Safe-NET display during defrost. It will show the discharge air temperature when the evaporator coil has returned back to stabilized operating temperature.

During defrost, the condensate pump will pump defrost water to the condensate pan located at the top of the merchandiser. On low temperature cases, the fans shut off during defrost, and electric defrost heaters energize to melt the frost off the evaporator coil. Defrost terminates when the evaporator coil reaches approximately 48°F. On medium temperature cases, the fans runs continuously, there are no defrost heaters, and defrost is time-terminated after 60 minutes.

Safe-NET III CONTROL SETTINGS AND OPERATION

These instructions are written for normal frozen food, ice cream, or medium temperature application, and provide optimum settings for normal store conditions. **Refer to the Safe-NET instructions starting on Page 2-5.** There is also a chart that shows low temp. and medium temp. Freedom settings.

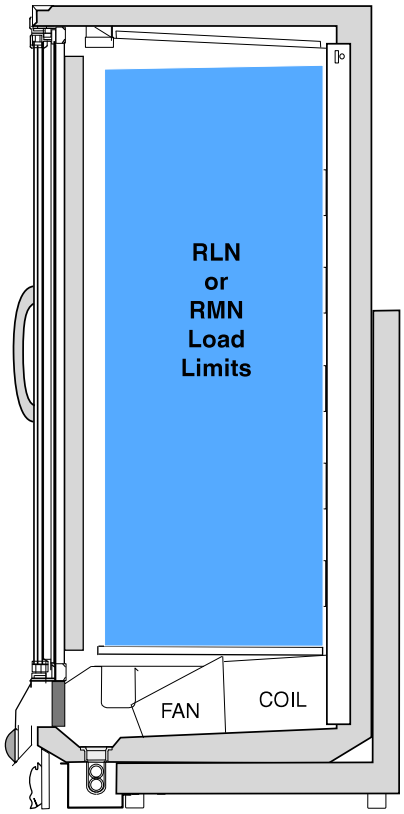
Another reference is the Safe-NET III Manual available on the Hussmann website.

CHECKLIST AFTER 12 HOUR RUN TIME

- Check case temperature.
- Verify that the fans are running. (The fans will be off if the case is in a defrost cycle. They will come back on after the completion of this cycle.)
- Initiate a defrost cycle and ensure the heaters are working properly. See the Safe-NET III instructions for how to force a defrost cycle. Check the amp draw at the terminal block, located in the front electrical raceway, just below the right most door of the case.)
- Check the door operation again, to ensure they close properly once the case is down to operating temperature.
- Are all inspection plates and covers properly replaced?
- Inspect for any water accumulation resulting from incorrect or unsealed penetrations where electrical or other lines pass through the case insulated walls.
- Check that the lights come on when the light switch is in the ***on*** position.
- Check that the condensate pump turns on and pumps water to the condensate pan during defrost, with no leaks. The pump will be on for only a few seconds.
- See the merchandiser's Data Sheet Set for refrigerant settings and defrost requirements. Bring merchandisers down to the operating temperatures listed on the data sheet.

LOAD LIMITS

Shelf life of perishables will be short if load limit is violated. **AT NO TIME SHOULD MERCHANDISERS BE STOCKED BEYOND THE LOAD LIMITS INDICATED.**



STOCKING

Product should NOT be placed in merchandisers until all refrigeration controls have been adjusted and merchandisers are at proper operating temperature.

All shelves and the lower deck are intended to display product. Shelf height is adjustable in one inch increments. Spacing of 12 inches is recommended for most applications. Maximum load per shelf is 170 pounds. Merchandisers may be ordered with optional "L" shaped wire shelves.

Proper rotation of product during stocking is necessary to prevent product loss. Always bring the oldest product to the front and set the newest to the back.

AIR DISCHARGE AND RETURN FLUES MUST REMAIN OPEN AND FREE OF OBSTRUCTION AT ALL TIMES to provide proper refrigeration and air curtain performance. Do not allow product, packages, signs, etc. to block these grilles. Do not use non-approved shelving, baskets, display racks, or any accessory that could hamper air curtain performance.

Do not prop doors open while stocking. And keep the doors closed as much as possible to prevent coil frosting and high merchandiser temperature.

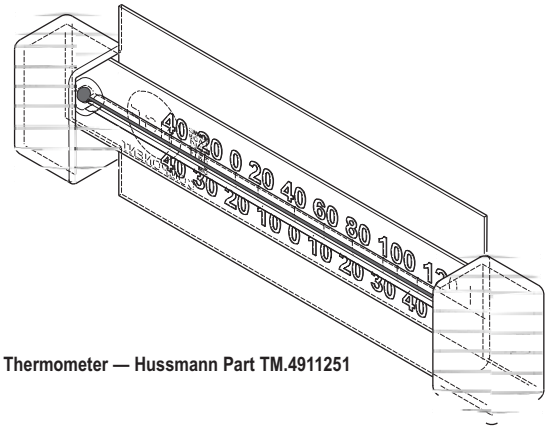
INSTALLING FDA/NSF REQUIRED THERMOMETER

The following pages provide the same information that ships with the thermometer.

This requirement does not apply to display refrigerators intended for bulk produce (refer to Page 1-1).

Please note that the tape cannot be exposed after installation.

This is an NSF-7 & US FDA Food Code Required Thermometer



Thermometer — Hussmann Part TM.4911251

Hussmann Corporation • 12999 St. Charles Rock Road • Bridgeton, MO 63044-2483
U.S. & Canada 1-800-922-1919 • Mexico 1-800-522-1900 • www.hussmann.com
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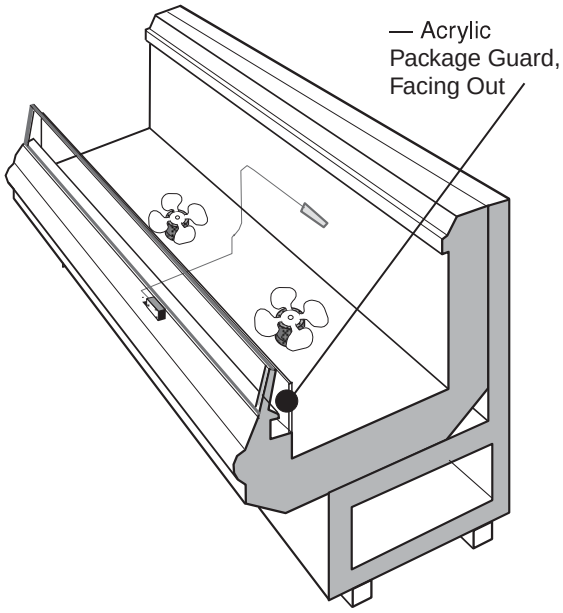
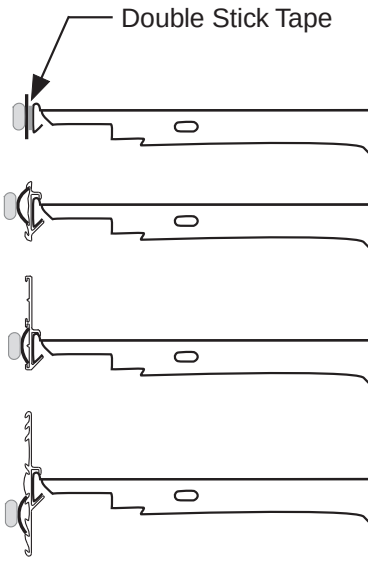
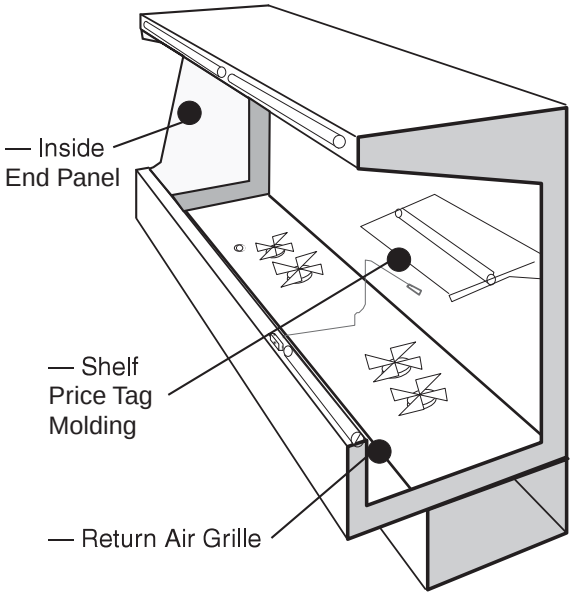
Suggested Mounting Locations in Single Deck Glass Front Impact Merchandisers





Flexible Plastic Fits in Price Tag Moldings



Suggested Mounting Locations in Multi-deck Merchandisers

Hussmann P/N 0429971_C 10/2007

Important – Please read!

This thermometer is provided in response to United States Food and Drug Administration (US FDA) Food Code [http://www.fda.gov/] and National Sanitation Foundation (NSF / ANSI) Standard 7 [http://www.nsf.org/]

Each installation will be different depending on how the unit is stocked, shopping patterns in the department and ambient conditions of the store. The suggested locations provided herein are possible locations. It is the responsibility of the purchaser / user to determine the location within the food storage area of the unit that best meets the code requirements above.

The thermometer may need to be moved several times to find the warmest location. Mounting options include flexible plastic for price tag molding application, magnet applied to back of flexible plastic for steel end wall, and double stick tape. Tape must not be exposed after installation.

Questions about either code should be addressed to local agencies or other appropriate officials.

Keep with merchandiser

or give to store manager.

DO NOT DESTROY.

MAINTENANCE

CARE AND CLEANING

Long life and satisfactory performance of any equipment is dependent upon the care it receives. To ensure long life, proper sanitation and minimum maintenance costs, these merchandisers should be thoroughly cleaned, all debris removed and the interiors washed down, weekly.

Always*Clear™ Glass
Wipe inside of glass with isopropyl alcohol and a soft cloth. Allow surface to dry before closing door. Use of other cleaners or abrasives may damage the Always*Clear surface, and/or void the warranty. Refer to manual that ships with doors..

Exterior Surfaces
The exterior surfaces should be cleaned with a mild detergent and warm water to protect and maintain their attractive finish. **NEVER USE ABRASIVE CLEANSERS OR SCOURING PADS.**

Interior Surfaces
The interior surfaces may be cleaned with most domestic detergents, ammonia based cleaners and sanitizing solutions with no harm to the surface.

DO NOT USE:

- Abrasive cleansers and scouring pads, as these will mar the finish.
- Solvent, oil or acidic based cleaners on any interior surfaces.
- Ammonia based cleaners on acrylic surfaces.

⚠ WARNING

Do NOT allow cleaning agent or cloth to contact food product. Product will be degraded and may spoil if allowed to sit in a non-refrigerated area.

DO:

- Remove the product and all loose debris to avoid clogging the waste outlet.
- Store product in a refrigerated area such as a freezer. Remove only as much product as can be taken to the freezer in a timely manner.
- **First turn off refrigeration, then disconnect electrical power.**
- Thoroughly clean all surfaces with soap and hot water. **DO NOT USE STEAM OR HIGH WATER PRESSURE HOSES TO WASH THE INTERIOR.** THESE WILL DESTROY THE MERCHANDISERS' SEALING CAUSING LEAKS AND POOR PERFORMANCE.
- Remove screws and lift hinged fan plenum for cleaning. BE SURE TO REPOSITION THE FAN PLENUM AFTER CLEANING MERCHANDISER.
- Take care to minimize direct contact between fan motors and cleaning or rinse water.
- Rinse with hot water, but do NOT flood. **NEVER INTRODUCE WATER FASTER THAN THE WASTE OUTLET CAN REMOVE IT.**
- Allow merchandisers to dry before resuming operation.
- After cleaning is completed, turn on power and refrigerant to the merchandiser.
- Verify that merchandiser is working properly.

⚠ WARNING

Do NOT use HOT water on COLD glass surfaces. This can cause the glass to shatter and could result in personal injury. Allow glass doors to warm before applying hot water.

SHUT FANS OFF DURING CLEANING PROCESS.

Fan Plenum
To facilitate cleaning, the fan plenum is hinged and also fastened with screws at each end. After cleaning be sure the plenum is properly lowered into position and that screws are reinstalled OR PRODUCT LOSS WILL RESULT due to improper refrigeration.

CLEANING HONEYCOMB ASSEMBLIES

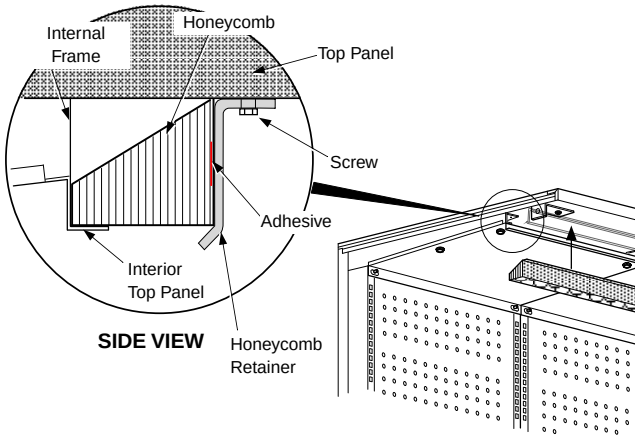
Honeycombs should be cleaned every six months. Dirty honeycombs will cause merchandisers to perform poorly. The honeycombs may be cleaned with a vacuum cleaner. Soap and water may be used if all water is removed from the honeycomb cells before reassembling. Be careful not to damage the honeycombs.

1. Remove the sheet metal screws located in the front metal retainer which holds the honeycomb assembly in place.

2. Lift the honeycomb assembly out of the L-bracket to remove it.

3. Clean and dry the honeycomb.

4. After cleaning, reassemble in reverse order of removal.



CLEANING STAINLESS STEEL SURFACES

Use non-abrasive cleaning materials, and always polish with grain of the steel. Use warm water or add a mild detergent to the water and apply with a cloth. Always wipe rails dry after wetting.

Use alkaline chlorinated or non-chlorine containing cleaners such as window cleaners and mild detergents. Do not use cleaners containing salts as this may cause pitting and rusting of the stainless steel finish. Do not use bleach.

Clean frequently to avoid build-up of hard, stubborn stains. A stainless steel cleaning solution may be used periodically to minimize scratching and remove stains. Rinse and wipe dry immediately after cleaning. Never use hydrochloric acid (muratic acid) on stainless steel.

CLEANING UNDER MERCHANDISERS

Remove splashguards not sealed to floor. Use a vacuum with a long wand attachment to remove accumulated dust and debris from under the merchandiser.

REMOVING SCRATCHES FROM BUMPER

Most scratches and dings can be removed using the following procedure.

1. Use steel wool to smooth out the surface area of the bumper or top rail.

2. Clean area.

3. Apply vinyl or car wax and polish surface for a smooth glossy finish.

Mimimum Suggested Cleaning and Maintenance Frequency
with Separate TOP-MOUNTED Condensing Unit*

Case Component	Type of Scheduled Maintenance	Maintenance Frequency (Times / Year)*	Average Maintenance Duration (hours)*	Total Estimated Maintenance Time/Year (hours)
Evaporator Coil / Case Interior	Cleaning	1	2	2
Honeycomb	Cleaning	1	0.05	0.05
Return Air Grille	Cleaning	12	0.1	1.2
Drip Piping	Cleaning	6	0.1	0.6
Condenser Coil	Cleaning	4	0.1	0.4
Condensate Evaporation Pan	Cleaning	4	0.2	0.8
Condensate Evaporation Pan Heater	None	N/A	N/A	N/A
Condensate Pump	Cleaning	6	0.05	0.03
Compressor	None	N/A	N/A	N/A
Electromechanical Thermostats	Replacement	0.2	1	0.2
Compressor Power Relays	Replacement	0.2	1	0.2

*This table is provided for reference only. The suggested maintenance frequency is the minimum required to reduce unexpected equipment failure. Performance and efficiency may be enhanced with more frequent cleaning. Individual cleaning schedules must take into account local environment and usage, as well as all applicable health codes.

Notes:

SERVICE

REPLACING FAN MOTORS AND BLADES

See cross section for location of evaporator fans. Should it ever be necessary to service or replace the fan motors or blades be certain that the fan blades are re-installed correctly.

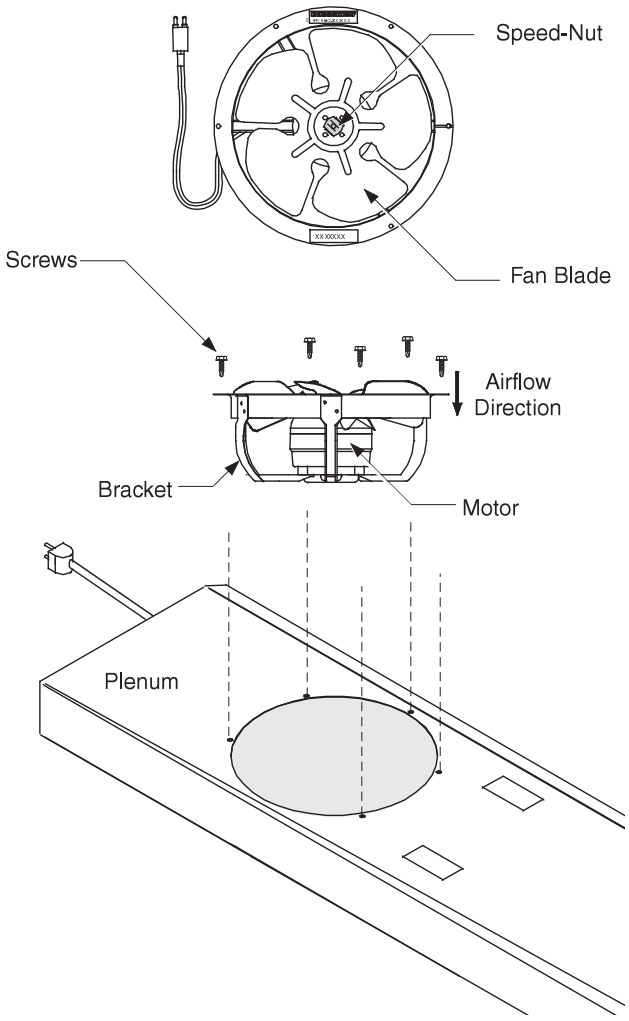
For access to **RLN / RMN** fans:

1. Turn off power.
2. Remove bottom display pans.
3. **Disconnect fan from wiring harness.**
4. Remove fan blade.
5. Remove screws holding fan motor/bracket assembly to plenum and remove assembly.
6. Replace fan motor/bracket assembly and reinstall screws.
7. Reinstall fan blade.
8. Reconnect fan to wiring harness.
9. Turn on power.
10. Verify that motor is working and blade is turning in the correct direction.
11. Close air gaps under fan plenum. Warmer air moving into refrigerated air reduces effective cooling. If the plenum does not rest against the case bottom without gaps, apply foam tape to the bottom of the fan plenum to reduce improper air movement. Use silicone sealant to close other gaps.
12. Replace display pans. Bring merchandiser to operating temperature before restocking.

⚠ WARNING

Always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to, such items as fans, heaters, thermostats and lights.

Fan Assembly



Hussmann recommends against frame heater cycling with *Innovator* doors to prevent door seals from freezing to the frames and tearing.

⚠ WARNING

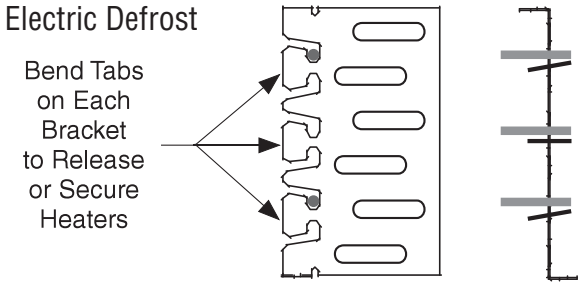
Product will be degraded and may spoil if allowed to sit in a non-refrigerated area.

REPLACING ELECTRIC DEFROST HEATERS

Electric defrost requires a heater on the front and rear of the coil as shown. The heaters are held in place by tabs in the coil brackets.

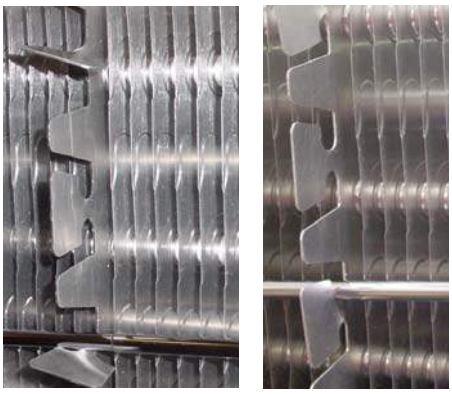
Front Defrost Heater

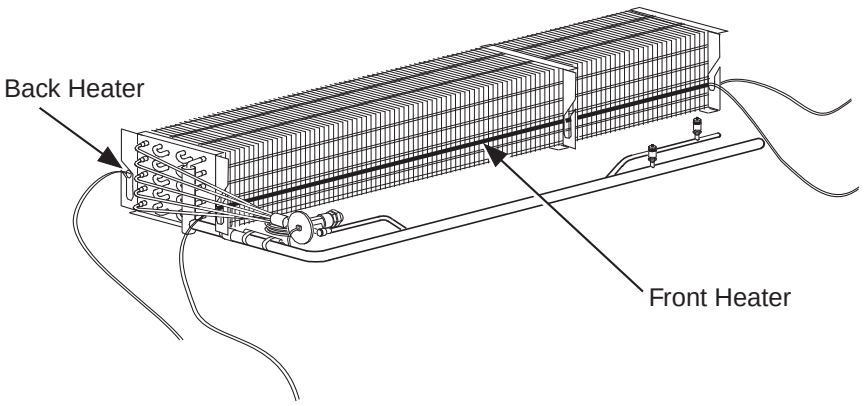
1. Disconnect power.
2. Lift fan plenum up and back to access the heater.
3. Bend tabs holding heater to horizontal.
4. Remove heater from coil bracket.
5. Position new heater in bracket.
6. Bend tabs back to vertical to hold heater in bracket.
7. Replace the coil cover and lower fan plenum.
8. Turn on power.
9. Verify that heater is working correctly.
10. Close air gaps under fan plenum. Warmer air moving into refrigerated air reduces effective cooling. If the plenum does not rest against the case bottom without gaps, apply foam tape to the bottom of the fan plenum to reduce improper air movement. Use silicone sealant to close other gaps.
11. Replace display pans. Bring merchandiser to operating temperature before restocking.



Rear Defrost Heater

1. Disconnect Power.
2. Remove coil cover.
3. Remove clips holding heater to coil tube.
4. Remove heater from slots in coil bracket.





5. Position new heater in slots.
6. Replace clips.
7. Replace the coil cover.
8. Turn on power.
9. Verify that heater is working correctly.
10. Replace display pans. Bring merchandiser to operating temperature before restocking.

⚠ WARNING

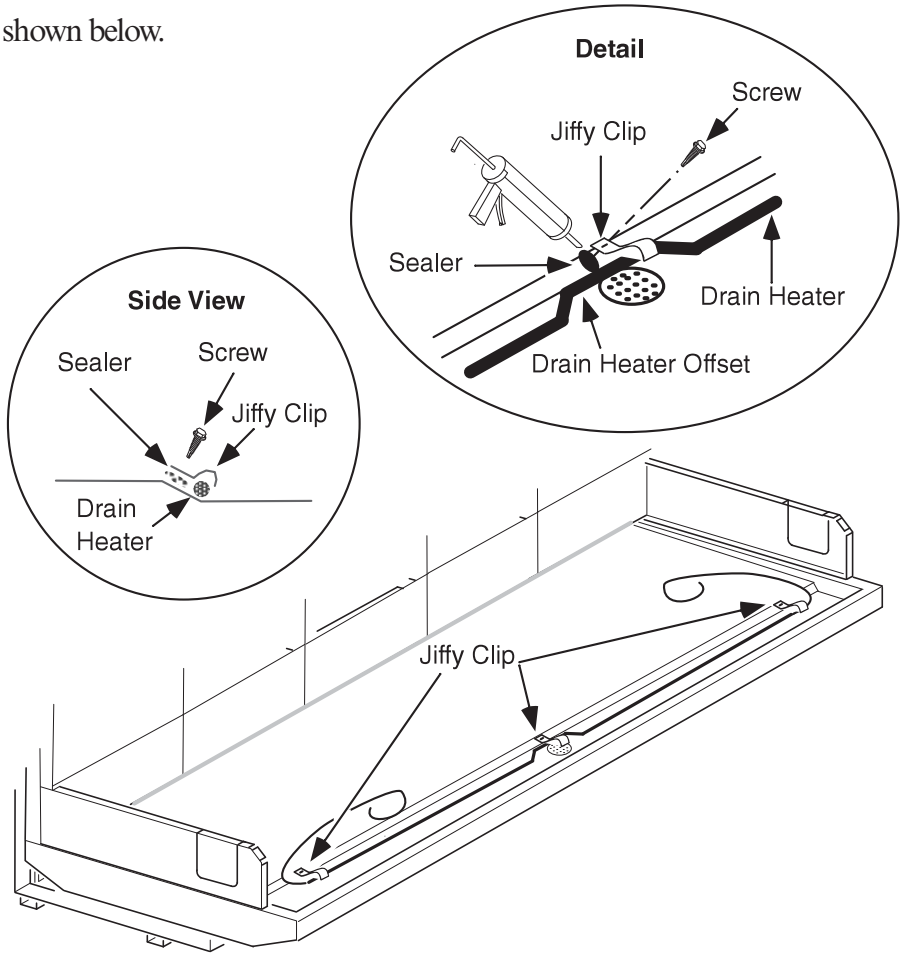
Always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to, such items as fans, heaters, thermostats and lights.

REPLACING DRAIN PAN HEATER — ELECTRIC AND GAS DEFROST (Low Temperature Only)

The drain pan heater is located as shown below.

Remove Drain Pan Heater

1. Disconnect power.
2. Pull heater out from under jiffy clips.
3. Position new heater under jiffy clips. Be sure offset is properly positioned around the drain. If jiffy clips are removed, **make certain sealer is replaced.**
4. Reconnect power.
5. Verify that heater is working correctly.



SERVICING VERTICAL LIGHTING

Refer to door manufacturer's manual for servicing of vertical lamps.

SERVICING DOORS AND FRAMES

See door manufacturer's service manual for servicing information. One manual is shipped with each merchandiser.

REPLACING DOOR OR DOOR FRAME PARTS

Parts for Reach-in doors and door frame assemblies must be ordered direct from the door manufacturer This includes the glass doors, door frame assemblies, lamps, ballasts, door handles, hold open slides, and power cords.

Refer to specific warranty supplied with the door. The manufacturers have a warranty against moisture penetration, a warranty against tempered glass breakage, and a warranty on ballasts. Lamps are not covered by Hussmann or the door manufacturer.

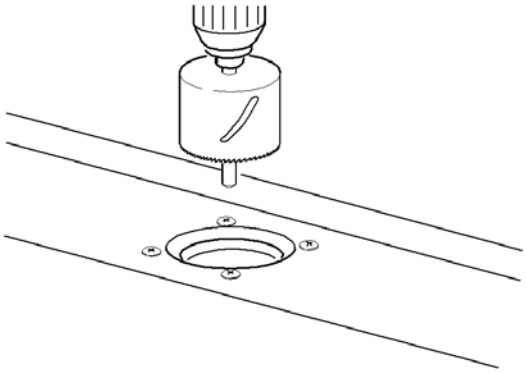
REPLACING DAMAGED DRAIN FITTING

The following procedure is for the field repair of a broken drain fitting.

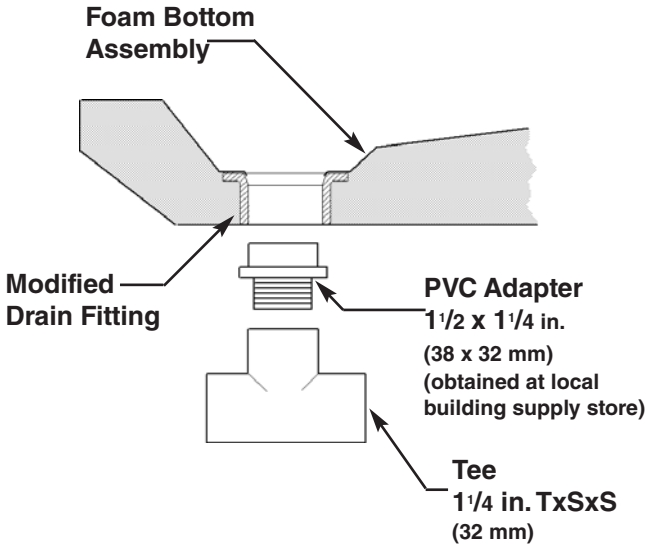
1. Use a drill with a 1 7/8-inch (48 mm) hole saw to drill out the bottom of the drain fitting. Be sure to drill completely through fitting and bottom liner.

2. Apply teflon tape to threaded end of adapter and screw into threaded end of tee.

3. Apply an ABS and PVC compatible primer and sealer to adapter and inside of drain. Insert adapter into drain fitting.



Drain Fitting Viewed from Inside Case


Foam Bottom Assembly
Modified Drain Fitting
PVC Adapter 1 1/2 x 1 1/4 in. (38 x 32 mm) (obtained at local building supply store)
Tee 1 1/4 in. TxSxS (32 mm)

End Section View

REPAIRING ALUMINUM COIL

The aluminum coils used in Hussmann merchandisers may be easily repaired in the field. Materials are available from local refrigeration wholesalers.

Hussmann recommends the following solders and technique:

Solders

Aladdin Welding Products Inc.
P.O. Box 7188
1300 Burton St.
Grand Rapids, MI 49507
Phone: 1-800-645-3413
Fax: 1-800-645-3414

X-Ergon
1570 E. Northgate
P.O. Box 2102
Irving, TX 75062
Phone: 1-800-527-9916

NOTE:

Hussmann Aluminum melts at	1125°F (607°C)
Aladdin 3-in-1 rod at	732°F (389°C)
X-Ergon Acid core at	455°F (235°C)

Technique:

1. Locate Leak.
2. REMOVE ALL PRESSURE.
3. Brush area UNDER HEAT.
4. Use PRESTOLITE TORCH ONLY. Number 6 tip.
5. Maintain separate set of stainless steel brushes and USE ONLY ON ALUMINUM.
6. Tin surface around area.
7. Brush tinned surface UNDER HEAT, thoroughly filling the open pores around leak.
8. Repair leak. Let aluminum melt solder, NOT the torch.
9. Don't repair for looks. Go for thickness.
10. Perform a leak check.
11. Wash with water.
12. Cover with a good flexible sealant.

The instructions on the following pages detail the installation and operation of the Electronic Unit Controller. These instructions are reprinted with permission from: Emerson Climate Technologies, Inc.

Notes:

EMERSON Climate Technologies

Application Engineering

Copeland brand products

BULLETIN

AE8-1376 R1

May 2012

Electronic Unit Controller

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Safety Instructions

Copeland™ brand products are manufactured according to the latest U.S. and European Safety Standards. Particular emphasis has been placed on the user's safety. Safey icons are explained below and safety instructions applicable to the products in this bulletin are grouped on Page 3. These instructions should be retained throughout the lifetime of the compessor. **You are strongly advised to follow these safety instructions.**

Safety Icon Explanation

DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	NOTICE is used to address practices not related to personal injury.
CAUTION	CAUTION, without the safety alert symbol, is used to address practices not related to personal injury.

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Instructions Pertaining to Risk of Electrical Shock, Fire, or Injury to Persons

WARNING	**ELECTRICAL SHOCK HAZARD** • Disconnect and lock out power before servicing. • Discharge all capacitors before servicing. • Use compressor with grounded system only. • Molded electrical plug must be used with all -1XX and -8XX bills of material. • Refer to original equipment wiring diagrams. • Electrical connections must be made by qualified electrical personnel. • Failure to follow these warnings could result in serious personal injury.
WARNING	**PRESSURIZED SYSTEM HAZARD** • System contains refrigerant and oil under pressure. • Remove refrigerant from both the high and low compressor side before removing compressor. • Use appropriate back up wrenches on rotalock fittings when servicing. • Never install a system and leave it unattended when it has no charge, a holding charge, or with the service valves closed without electrically locking out the system. • Use only approved refrigerants and refrigeration oils. • Personal safety equipment must be used. • Failure to follow these warnings could result in serious personal injury.
WARNING	**BURN HAZARD** • Do not touch the compressor until it has cooled down. • Ensure that materials and wiring do not touch high temperature areas of the compressor. • Use caution when brazing system components. • Personal safety equipment must be used. • Failure to follow these warnings could result in serious personal injury or property damage.
CAUTION	**COMPRESSOR HANDLING** • Use the appropriate lifting devices to move compressors. • Personal safety equipment must be used. • Failure to follow these warnings could result in personal injury or property damage.

Safety Statements

- Refrigerant compressors must be employed only for their intended use.
- Only qualified and authorized HVAC or refrigeration personnel are permitted to install, commission and maintain this equipment.
- Electrical connections must be made by qualified electrical personnel.
- All valid standards and codes for installing, servicing, and maintaining electrical and refrigeration equipment must be observed.

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1. Introduction and Features

The introduction of the Electronic Unit Controller to Copeland™ brand condensing units will provide many benefits to the contractor and end-user. It has been designed specifically for demanding refrigeration applications to ensure precision in installation and operation. While the Electronic Unit Controller will replace existing adjustable low pressure controls, fan cycle switches and other relays, it also has additional features. These features include bump start (where applicable), data storage and short cycling protection (See **Figure 3**). This controller does NOT replace the fixed high pressure control required by UL.

The Electronic Unit Controller can be used on any condensing unit application with the appropriate sensors and relays that will be factory installed on the condensing unit. This document will explain how Electronic Unit Controllers affects your installation process and how it can also assist in troubleshooting if the need arises. (See Sections 2 and 8 for more details)

Controllers will be preprogrammed with the proper settings, resulting in little to no setup time. The unit will come with an attached label showing how to adjust the low pressure cut-in and cut out (See **Figure 1**). There will also be an additional label on the inside of the enclosure which will also list all of the factory default settings for the controller, including those that are not adjustable (See **Figure 2**). The inside label will also

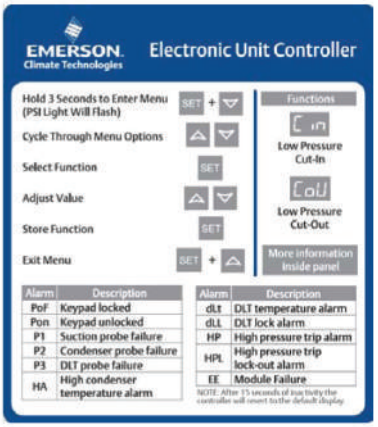

Figure 1

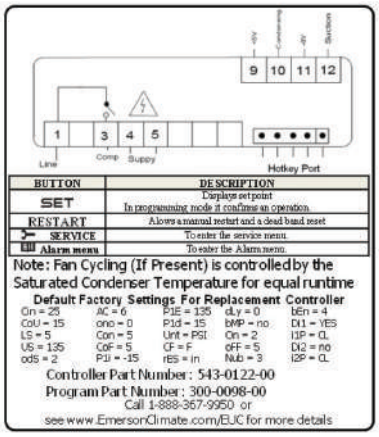

Figure 2

Features	Today	Dixell
Low Pressure Control	Adjustable Mechanical Switch	Suction Pressure Transducer
High Pressure UL Safety Control	Adjustable or Fixed Mechanical Switch	Fixed Mechanical Switch
Fan Cycling	2 Mechanical Switches	Mid Coil Temperature Sensor
Time Delay	Timing module	Built In
Discharge Line Protection	Mechanical Thermostat	Temperature Sensor
Bump Start	Timing Module	Built In
Multi-Refrigerant Approval	2 Adjustable Mechanical Pressure Switches	Utilize Mid Coil Temperature Sensors
Data Storage	Performance Alert*	Built In
Short Cycle Protection	Performance Alert*	Built In

Figure 3

*Copeland PerformanceAlert is not replaced by the Electronic Pressure Control. The PerformanceAlert module includes many features not included in the Electronic Pressure Control, such as locked rotor protection, loss of phase, etc. The Electronic Pressure Control is able to interface with PerformanceAlert to display error codes in an easy-to-read format.

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include a basic wiring diagram for the controller, basic descriptions of what the buttons on the controller does, the controller part number and the part number for the pre-loaded program. A phone number to contact and a website for more information will be available on the inside label as well.

1.1 Technical Specifications

Mounting: Panel mounting in a 71x29mm panel cut-out
Controller IP Rating: IP20
Front Panel IP rating: IP65
Power supply: 230Vac ±10%, 50/60Hz
110Vac ±10%, 50/60Hz
Power absorption: 3VA max
Relay outputs:
Compressor Relay: 250VAC, 16A FLA, 96A LRA
Fan Relay 1: 250VAC, 4.9 FLA, 29.4 LRA
Fan Relay 2: 250VAC, 1.9 FLA. 11.4 LRA
Data storage: Non-volatile memory (EEPROM).
Rated impulsive voltage: 2500V; Overvoltage Category: II
Factory Installed Operating Range: -40 – 120°F Ambient
Non-Factory Installed Operating Range: -4 to 120°F Ambient

1.2 Pressure Probe Error Bypass

The pressure probe bypass is in place to allow the controller to run proper during pull down if a system has been off for a period of time and the suction pressure is greater than the maximum value the suction transducer can read (In most cases, 135 PSIG). If this occurs, the controller will flash the maximum value of the transducer for 15 minutes or until the suction pressure is pulled down below the maximum transducer value. The compressor will run continuously during this time unless the thermostat input or high pressure input are opened, or if there is a discharge line temperature trip. If the 15 minutes expires the pressure probe error P1 is signaled and the compressor is switched on and off cyclically with Con (default 5 minutes) and CoF (default 5 minutes) period.

1.3 Bump Start

Bump start is an optional feature which can provide additional flooded start protection. The compressor is turned on for 2 seconds, then turned off for 5 seconds 3 times before the compressor runs normally. This allows for refrigerant to exit the compressor without the oil being removed as well.

Bump start is enabled on all transport units, without the ability to be turned off. On most stationary units, it is turned off by default, but can be turned on in the Advanced Options Menu as by changing bMP to Yes. (See section 2.6).

2. Installation and Controller Operation Instructions

2.1 Condensing Unit Installation Instructions

A condensing unit with an Electronic Unit Controller will be installed exactly the same as a condensing unit with mechanical controls. Customer connections will not change, and in a vast majority of cases, wiring to the unit will not change as well. See section 6 for more information. The key difference with an Electronic Unit Controller is that setpoints are set electronically rather than mechanically. See section 2.5 for further details.

If the unit keeps shutting down during charging, the low pressure cut out can be lowered to allow it to run. Be sure to adjust it back to the proper setting after charging.

2.2 Controller Display

The controller display is shown in Figure 4 below. **Table 1** provides a description of each of the labeled lights. The controller is defaulted to display the current suction pressure to three significant digits in pounds per square inch gage (psig).

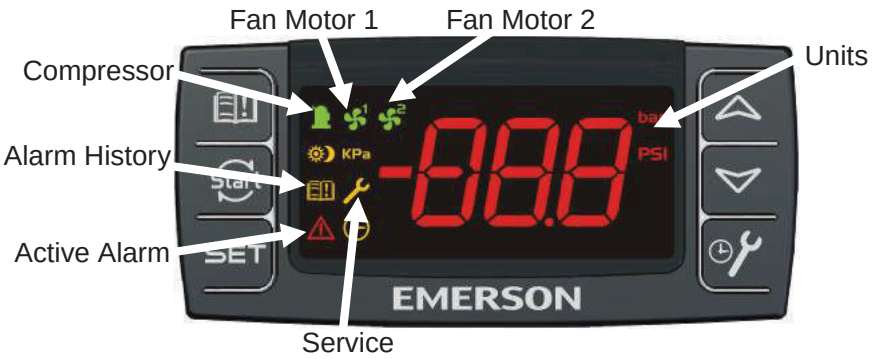

Figure 4

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Table 1 – LED Descriptions

LED	MODE	FUNCTION
	ON	Compressor On
	Flashing	Anti-short cycle delay enabled
1	ON	Fan1 On
2	ON	Fan 2 On
PSI	ON	Pressures displayed in PSIG
PSI	Flashing	Programming mode
	ON	Browsing the service menu
	Flashing	New alarm indication
	ON	You're browsing the alarm menu
	ON	An alarm is occurring

2.3 Button Descriptions and Key Combinations

Table 2 lists the different buttons on the controller (as shown in **Figure 4**) as well as their functions. **Table 3** lists the different key combinations that are available and their functions.

Table 2 – Button Descriptions

BUTTON	DESCRIPTION
SET	Displays set point In programming mode it confirms an operation.
RESTART	Hold for 3 seconds to do a manual restart or a dead band reset. (If a cut-out value is reached and the controller is waiting to reach a cut-in, the dead band reset will restart the system until the cut-out is reached again.
(UP)	In programming mode it browses the parameter codes or increases the displayed value.
(DOWN)	In programming mode it browses the parameter codes or decreases the displayed value.
SERVICE	To enter the service menu. (See Section 4)
Alarm menu	To enter the Alarm menu. (See Section 3)

Table 3 – Key Combinations

KEY COMBINATIONS:	
+	To lock & unlock the keyboard interface
SET+	To enter into programming mode.
SET+	To return to the suction pressure display.

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2.4 Viewing the Set Points:

1. Push and immediately release the **SET** key: the display will show the "C in" message.
2. Press **SET** to see the value;
3. Push and immediately release the **SET** key: the display will show the "CoU" message.
4. Press **SET** to see the value.

2.5 Changing a parameter value:

To change the parameter's value, operate as follows:
1. Hold down the **SET** + ▽ keys for 3 seconds or until the "**PSI"** LED starts blinking to enter the module's programming menu.
2. Use △ or ▽ to select the required parameter. Press the **SET** key to display its value.
3. Use △ or ▽ to change its value.
4. Press **SET** to store the new value.

TO EXIT: Press **SET +** △ or wait 15 seconds without pressing a key.
NOTE: the set value is stored even when the procedure is exited by waiting for the time-out to expire.

2.6 Entering the Advanced Options Menu:

The advanced options menu will be locked 5 minutes after the controller is powered. If you need to access this menu after this time, cycle power to the controller.
1. Enter the Programming mode by pressing the **SET** + ▽ keys for 3 seconds (the **PSI** LED starts blinking).
2. Release the keys, then push again the **SET** + ▽ keys for at least 7 seconds. The Pr2 label will be displayed immediately followed from the C i.n parameter.
   NOW YOU ARE IN THE ADVANCE OPTIONS MENU.
3. Use △ or ▽ to select the required parameter.
4. Press the **SET** key to display its value.
5. Use △ or ▽ to change its value.
6. Press **SET** to store the new value.

TO EXIT: Press **SET +** △ or wait 15 seconds without pressing a key.
NOTE1: if no parameter is present in Pr1, after 3 seconds the "noP" message is displayed. Keep the keys pushed until the Pr2 message is displayed.
NOTE2: the set value is stored even when the procedure is exited by waiting for the time-out to expire.

2.6.1 Moving Parameters between the Programming Menu and the Advanced Options Menu

While in the advanced options menu, certain parameters will have a (. period) in between the 2nd and 3rd character, for example C i.n.These parameters are in the Programming Menu as well as the Advanced Options Menu.

To add or remove a parameter from the programming menu, press the **SET** + ▽ keys together while the parameter name is on the display in the advanced options menu. The (. period) between the 2nd and 3rd parameter will either be added or removed.
To Exit: Press **SET** + △ or wait 15 seconds without pressing the keys.

2.7 Locking the Keypad

1. Keep pressed for more than 3 seconds the △ + ▽ keys.
2. The "POF" message will be displayed and the keyboard will be locked. At this point it will be possible only to see the set points.
3. If a key is pressed more than 3 seconds the "POF" message will be displayed.

2.8 Unlocking the Keypad

Keep pressed together for more than 3 seconds the △ + ▽ keys, until the **"**Pon**"** message is displayed.

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2.9 Resetting the Alarm and Runtime Counters

See sections 3 and 4 for more information on the Alarm and Service Menus.
The advanced options menu will be locked 5 minutes after the controller is powered. If you need to reset counters after this time, cycle power to the controller.

1. Enter the Programming mode by pressing the **SET** + ▽ keys for 3 seconds (the **PSI** LED starts blinking).
2. Release the keys, then push again the **SET** + ▽ keys for more than 7 seconds. The Pr2 label will be displayed immediately followed from the "Con" parameter.
   NOW YOU ARE IN THE ADVANCE OPTIONS MENU.
3. Use △ or ▽ to select the required parameter listed below.
   - rSA – Reset Alarm Counters **(HP, dLt,** and **Loc)**
   - rCA – Reset Compressor Starts Counters
   - rCH – Reset Compressor Run Hours Counters
   - rFH – Reset Fan Run Hours Counters
4. Press the **SET** key to display its value.
5. Use △ Change the n to y.
6. Press **SET** to store the new value and reset the counter
7. Repeat steps 3 to 6 to reset any additional counters

3. Alarm Menu

The controller records in the Alarm menu the total number of activations of the following alarms.

- High Pressure Trips (up to 999) - HP.
- High DLT temperature alarm (up to 999) - dLt.
- Total number of manual restarts (HPL and dLL) up to 255 - LOC.

To see the alarm counters:

1. Push and release the 📖 key.
2. The controller shows the HP label.
3. Push the **SET** key to see the number of high pressure trips.
4. The controller shows the dLt label.
5. Push the **SET** key to see the number of DLT Trips.
6. The controller shows the Loc label.
7. Push the **SET** key to see the number of manual resets.

4. Service Menu

In the **SERVICE** menu the following values are stored:

- **Number of compressor starts**: StH (0-999 resolution 1000); StL (0-999 resolution 1)
  Example: If StH = 12 StL = 500: the total number of compressor starts = 12,500
- **Compressor Run Hours**: CHH (0-65; res. 1000) CHL (0- 999; res. 1);
  Example: If CHH = 8 and CHL = 500, the total number of compressor run hours is 8,500
- **Fan Motor 1 Run Hours**: F1H (0-65; res. 1000) F1L (0-999; res. 1)
- **Fan Motor 2 Run Hours**: F2H (0-65; res. 1000) F2L (0-999; res. 1);

To see the Service Counters:

1. Push and hold the 🔧 key for 3 seconds
2. See the above list for the counter names and meanings.

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5. Parameter List

All of the parameters are listed below, along with their descriptions and default values. Depending on the condensing unit model, some of these values may be different or not applicable.

Table 4 – Parameters

Label	Description	Default	Range
	Default Display Value		
	Current Suction Pressure (PSIG)		
	Adjustable In Programming Menu		
C in	Compressor cut in (PSIG)	25	CoU – U5
CoU	Compressor cut out (PSIG)	15	L5 - C in
	Adjustable From Advanced Options Menu		
odS	Outputs delay at start up (seconds) (Only adjustable on single phase scroll units)	2 or 4	2 - 255
AC	Anti-short cycle delay (Minimum time between compressor off then on) (seconds)	6	6 - 900
Con	Compressor ON time with faulty probe (minutes)	5	0-255
CoF	Compressor OFF time with faulty probe (minutes)	5	0-255
P IF	Suction Pressure Transducer Offset (PSI)	0	- 120 - 120
biP	Bump start enabled	no	no - YES
nPS	Number of activation of DLT alarm in a hour to lock compressor (Units with discharge line temperature protection only)	4	0- 15; 0 = always automatic restart
HPn	UL safety digital input activation before compressor lock (Units with fixed high pressure controls only)	5	0- 15; 0 = always automatic restart
SF 1	Fan 1 Cut Out (°F) (Fan Cycling Units Only)	70	-40 - SF2
HF 1	Fan 1 differential (°F) (Fan Cycling Units Only)	10	1 - 100
SF2	Fan 2 Cut Out (°F) (Fan Cycling Units Only)	85	SF 1 - 230
HF2	Fan 2 differential (°F) (Fan Cycling Units Only)	15	1 - 100
rSA	Reset Alarm Counters (**HP**, **dLt**, and **Loc**)		
rCA	Reset Compressor Starts Counters		
rCH	Reset Compressor Run Hours Counters		
rFH	Reset Fan Run Hours Counters (Fan Cycling Units Only)		
	Factory Set Definitions		
L5	Minimum set point (PSIG)	-7 or 5	-7 - U5
U5	Maximum set point (PSIG)	135	L5 - 135
ono	Minimum time between two compressor starts (minutes)	0	0 - 15
nFA	Number of fans on during probe fault	2	0 - 2
Unt	Measurement unit for pressure: PSIG, bar, kPA	PSI	PSI , bAr, HPA
CF	Measurement unit for temperature	F	C or F
on	Bump Start Compressor on time (seconds)	2	1 - 15
oFF	Bump Start Compressor off time (seconds)	5	1 - 15
nUb	Number of cycle during bump start	3	1 - 15
bEn	Compressor stop time for next bump start (hours)	4.0	1.0 - 23.5
doF	DLT alarm temperature to stop compressor (°F)	220	don - 302
don	DLT temperature for compressor restart (°F)	170	-58 - doF
ALd	DLT Stop compressor delay (seconds)	0	0 - 255
dLF	Minimum time of compressor off with dLL alarm (minutes)	0	0 - 15
AU2	Cut In for Condenser Temperature/Pressure alarm (°F)	150	AH2 - 230
AH2	Cut Out for high Condenser Temperature/Pressure alarm (°F)	140	-40 - AU2
Ad2	High condenser temperature alarm delay (minutes)	0	0 - 255
HPF	Minimum off time after a High Pressure Trip (minutes)	0	0 - 15

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6. Controller Wiring

WARNING

Always disconnect and lockout the power supply before beginning electrical installations or troubleshooting.

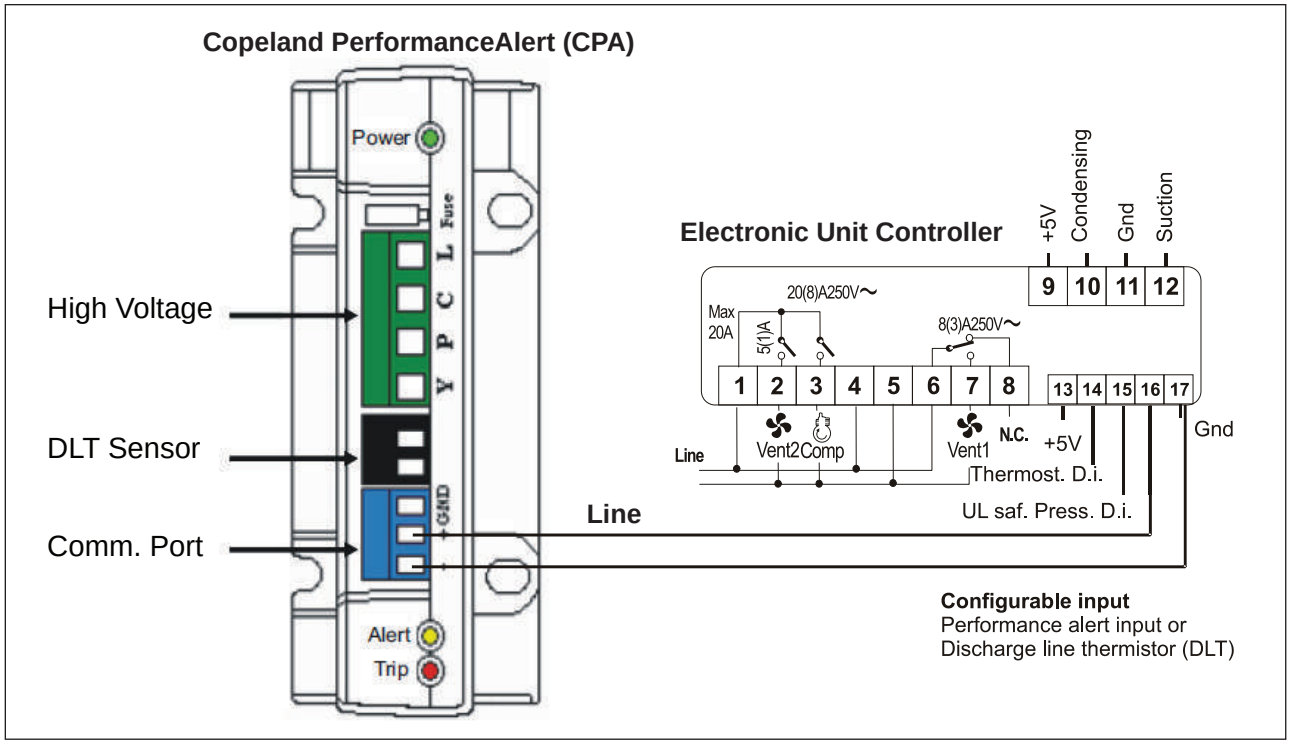

Figure 5 – Wiring Schematic for the Electronic Unit Controller with Copeland PerformanceAlert

Suction Pressure Transducer: Use terminal 9 (+5V) for supply, terminal 11 for ground and terminal 12 for signal
Condenser Temperature Sensor: Connect the probe to terminal 11 (ground) and 10
Thermostat input: use terminals 14-17
UL HP input: use terminals 15-17
DLT Sensor: Connect the probe to terminals 16-17
Copeland Performance Alert (CPA) connection: Connect the CPA as shown in the wiring diagram.
For more information on PerformanceAlert, see Application Engineering Bulletin **AE8-1347**.
Power supply: use terminals 4-5
Compressor: use terminals 1-3
FAN 1: use terminals 6-7
FAN 2: use terminals 1-2

6.1 Additional Controller Inputs

If any other controls are used to control the condensing unit, such as a defrost timer or a thermostat, they will need to be connected to terminals 14 and 17. These terminals are located on the hotkey cable. These two terminals will be connected together by push-ons, allowing easy connection. See **Figure 5** for wiring details

NOTE: If using a controller such as a thermostat with another device, such as a pump down solenoid, no connections with the controller are required.

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7. Alarms/Notifications

In the event of an issue, the below codes will flash to indicate the alarm condition.

Table 5 – Alarms And Notifications

Code	Description
PoF	Keypad locked
Pon	Keypad unlocked
P1	Suction probe failure
P2	Condenser probe failure
P3	DLT probe failure
HA	High condenser temperature alarm
dLt	DLT temperature alarm
dLL	DLT lock alarm
HP	High pressure trip alarm
HPL	High pressure trip lock-out alarm
CPA	Copeland PerformanceAlert not connected properly
EE	Module Failure

If a Copeland PerformanceAlert is installed in the unit, any error codes from the PerformanceAlert will be displayed on the screen of the Dixell controller. This eliminates the need to count light flashed on the PerformanceAlert itself. For more information on PerformanceAlert, see **AE8-1347**.

Table 6 – Copeland PerformanceAlert Error Codes

Code	Three Phase Recip	Three Phase Scroll	Single Phase
C01	Discharge Temperature Trip	Discharge Temperature Trip	Discharge Temperature Trip
C02	System Trip	System Trip	System Trip
C03	Short Cycling	Short Cycling	Short Cycling
C04	Locked Rotor	Locked Rotor	Locked Rotor
C05	Open Circuit	Open Circuit	Open Circuit
C06	Missing Phase	Missing Phase	Open Run
C07	NA	Reverse Phase	Open Start
C08	Welded Contactor	Welded Contactor	Welded Contactor
C09	Low Voltage	Low Voltage	Low Voltage
C10	Lost communications	Lost communications	Lost communications
C11	DLT Sensor Failure	DLT Sensor Failure	DLT Sensor Failure

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7.1 Discharge Line Temperature Protection

Discharge line temperature protection has traditionally been handled by a mechanical thermostat, which was always an automatic reset, and other than the system not running, gave no indication that a trip had occurred or is occurring. The Electronic Unit Controller uses a temperature sensor, which allows for more flexibility in what the controller can do. If the unit trips, the unit will display an error code and log that an error has occurred. In addition, the controller will allow an automatic reset up to 4 times per hour. On the fourth trip, the controller will require a manual reset. The parameter nPS can be changed in the Advanced Options Menu (see section 2.6) to adjust the total number of trips allowed in an hour before a lockout. If an always automatic reset is needed, then nPS can be set to 0. The default value for the discharge line cut-out is 220°F and the cut-in is 170°F.

7.2 UL High Pressure Safety Control

High pressure control is a UL safety device. As such, Emerson Climate Technologies' condensing units equipped with the Electronic Unit Controller still come with the high pressure mechanical control installed on the unit. The high pressure controls will all be fixed to work with the control, and the value of the cut-out will be determined by the working pressure of the high side of the condensing unit. This should have no affect on a customer's UL requirements.

The high pressure control will break power to the compressor output relay, which will shut down the compressor regardless of the program state. This change will also allow the controller to read the high pressure control state, and display the appropriate error codes as needed. In addition, the controller will allow an automatic reset up to 4 times per hour. On the fifth trip, the controller will require a manual reset. The parameter HPn can be changed in the Advanced Options Menu (See section 2.6) to adjust the total number of trips allowed in an hour before a lockout. If an always automatic reset is needed, then HPn should be set to 0.

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Hussmann Corporation
12999 St. Charles Rock Road
Bridgeton, MO 63044-2483
www.hussmann.com